IEEE ICC 2011

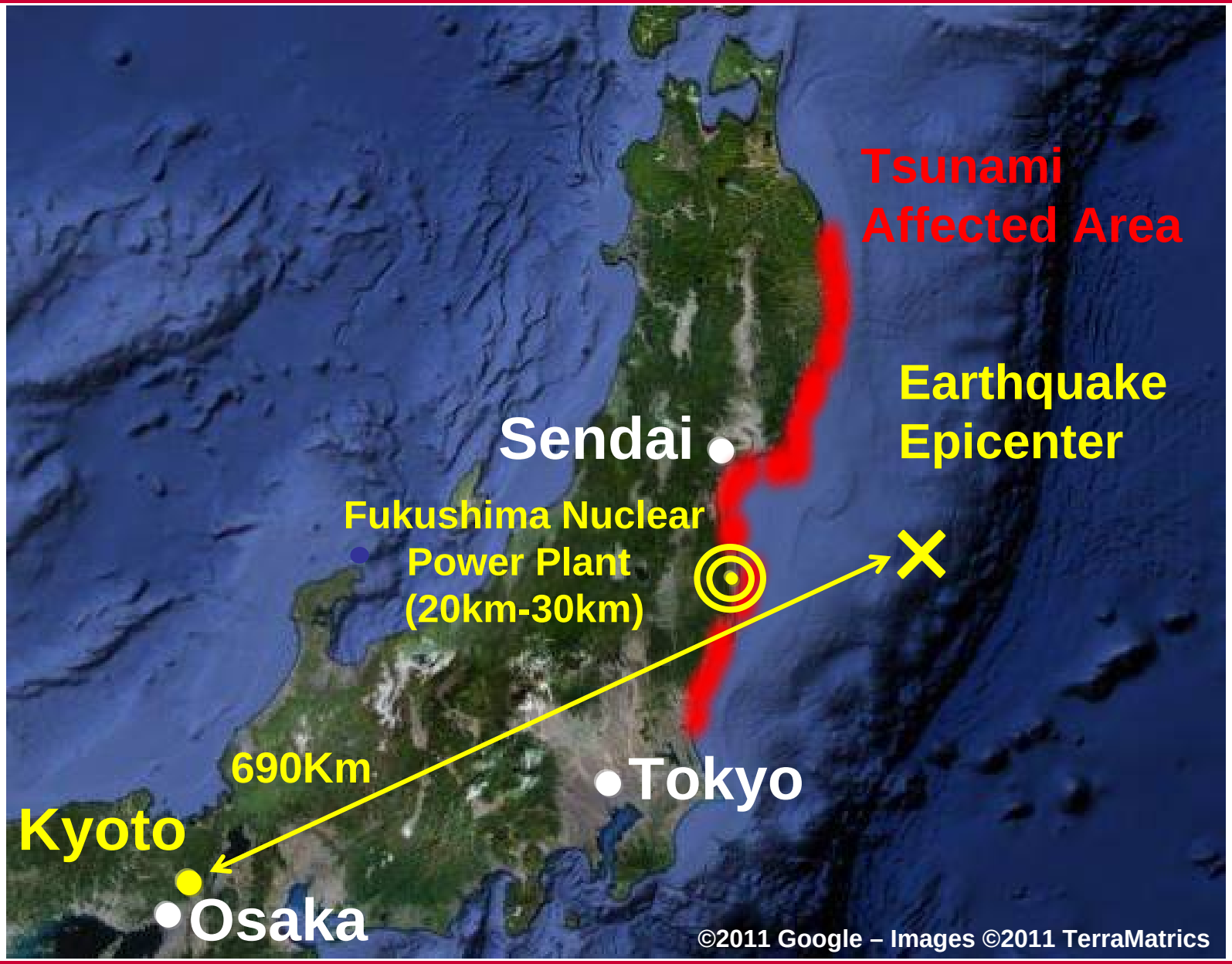
DOCOMO's Actions for New Growth

Ryuji Yamada
NTT DOCOMO, Inc.
June 6, 2011.

Table of Contents

1. DOCOMO's Response to the Great East Japan Earthquake

Great East Japan Earthquake: 14:46 Mar. 11, 2011



Damage of Tsunami: Minami-Sanriku (1)

Damage of Tsunami: Minami-Sanriku (2)

Base Station Equipment (1)

Ishinomaki-Midori, Miyagi

Base Station Equipment (2)

Ishinomaki-Midori, Miyagi

docomo SHOP (1)

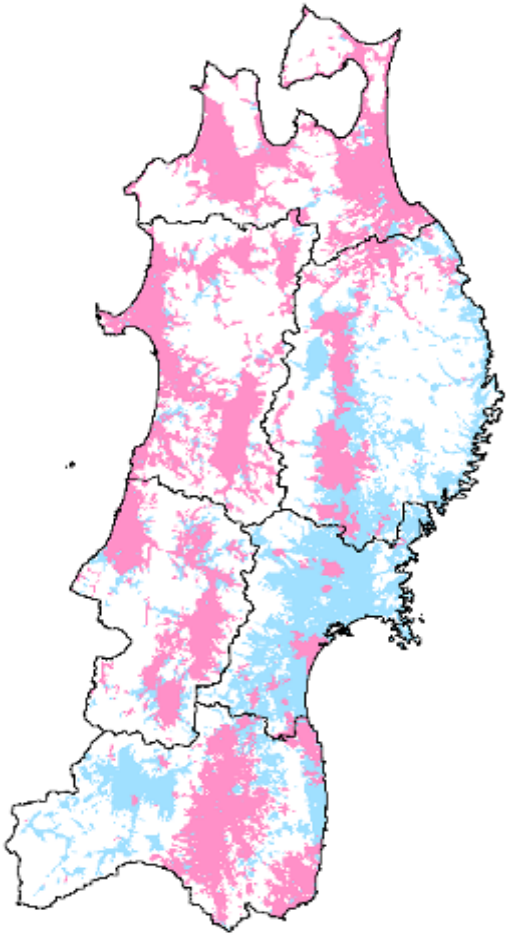
Ishinomaki-Higasi, Miyagi

docomo SHOP (2)

Ishinomaki-Higasi, Miyagi

Restoration Status of Service Areas

As of Mar. 12, 2011

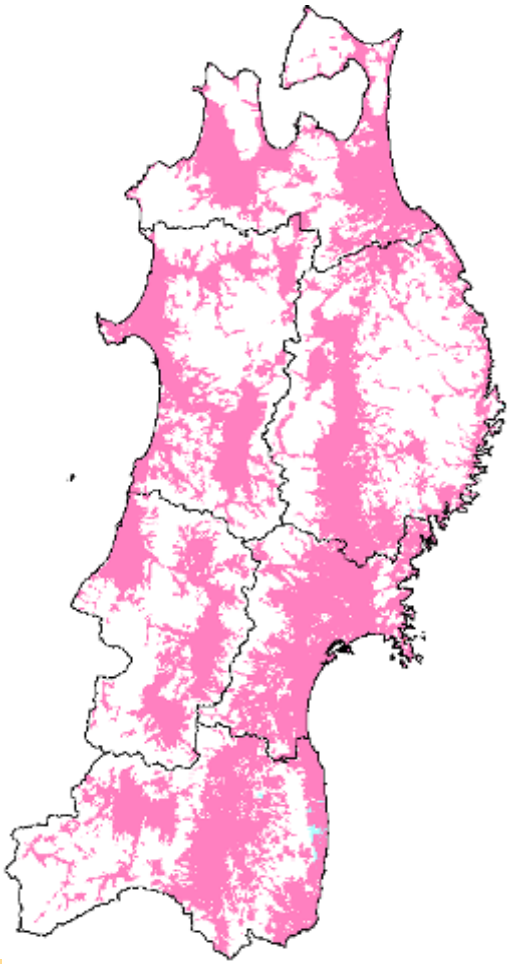


Service disrupted at 4,900 base stations

Service available

Service disrupted

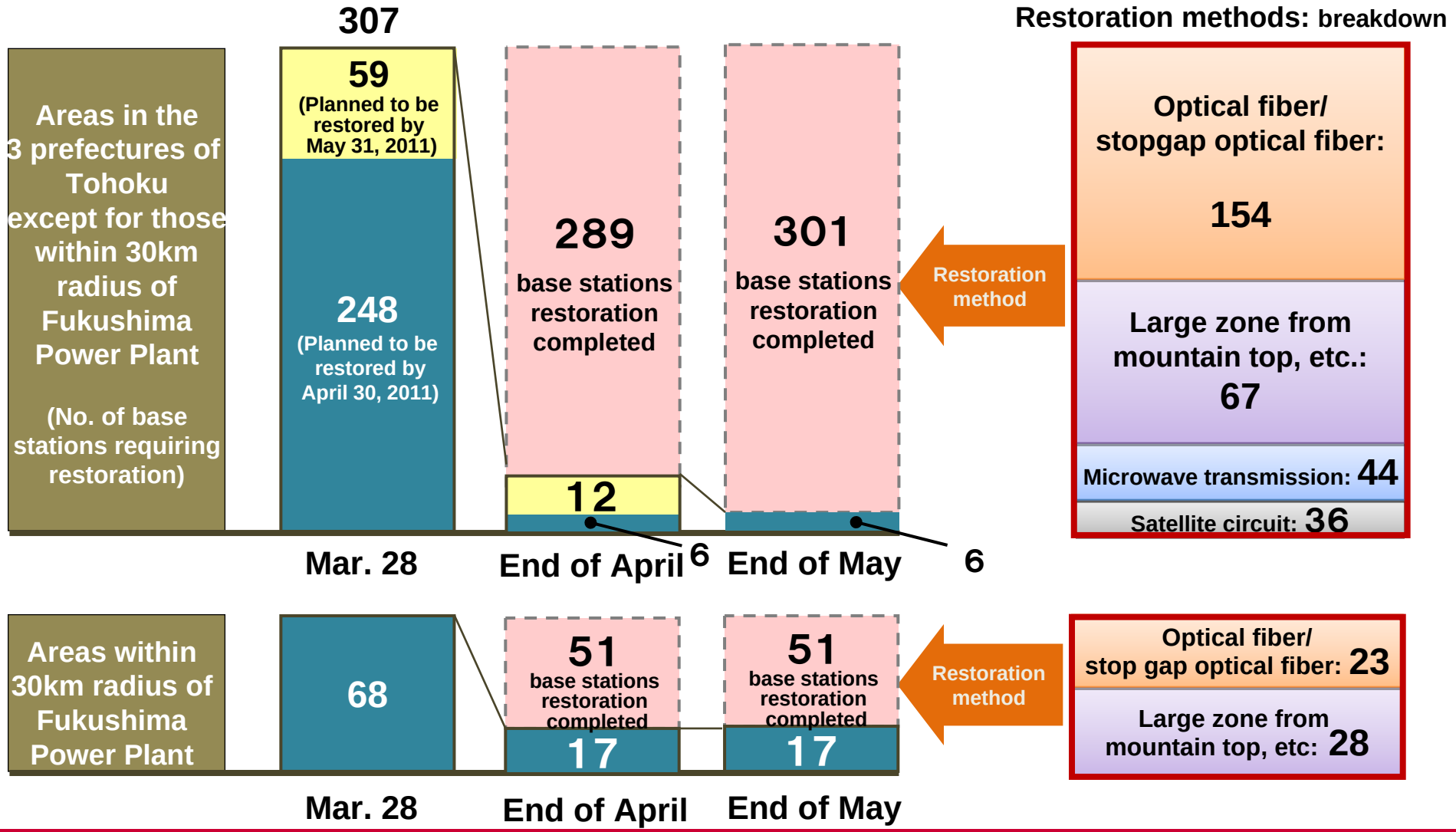
As of Apr. 30, 2011



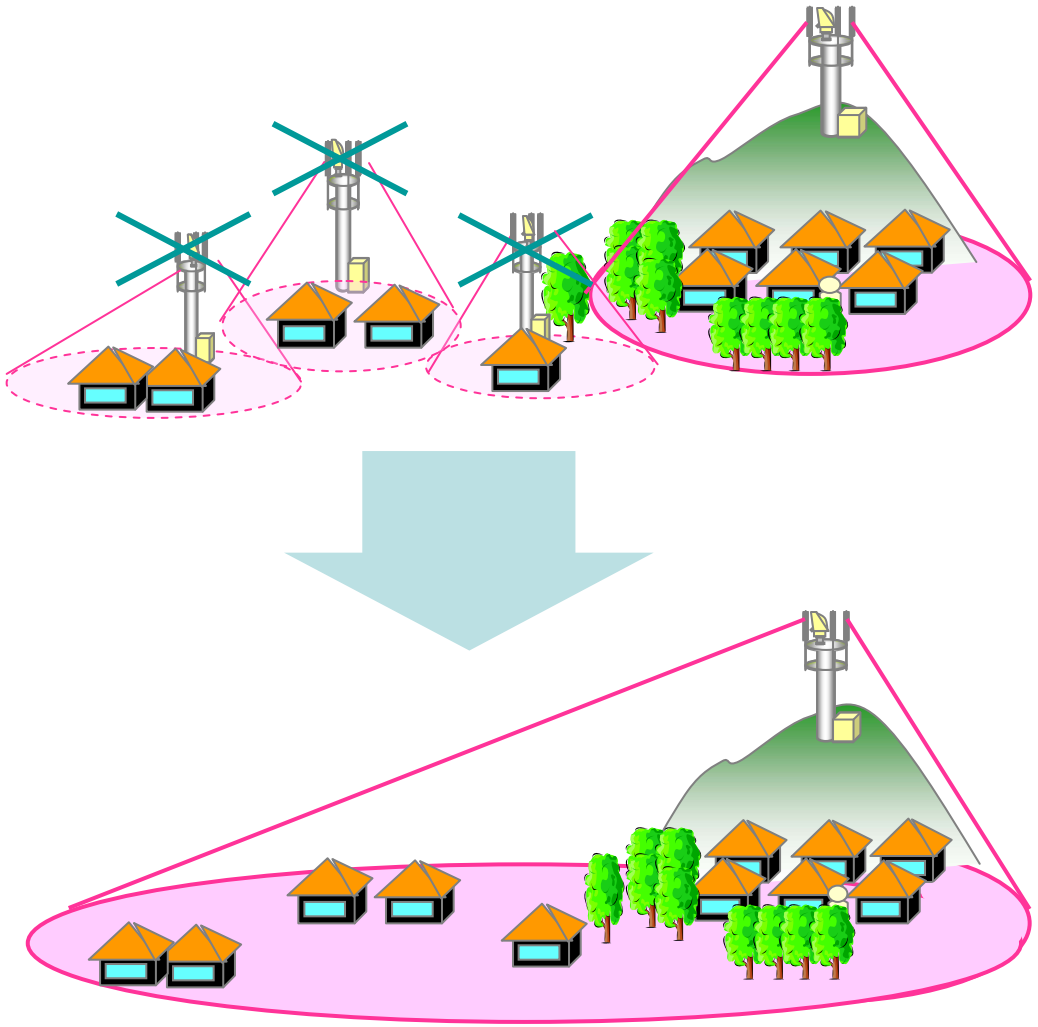
Restored to nearly pre-disaster level

Restoration Status of Facilities

- Restored almost all base station that required restoration as of March 31, except for a limited number of base stations located within 30Km radius of Fukushima Daiichi Nuclear Power Plant



Restoration using large-zone scheme



Minami-Sanriku, Miyagi

Restoration using satellite circuits

Ishinomaki, Miyagi

Installed high-performance antenna

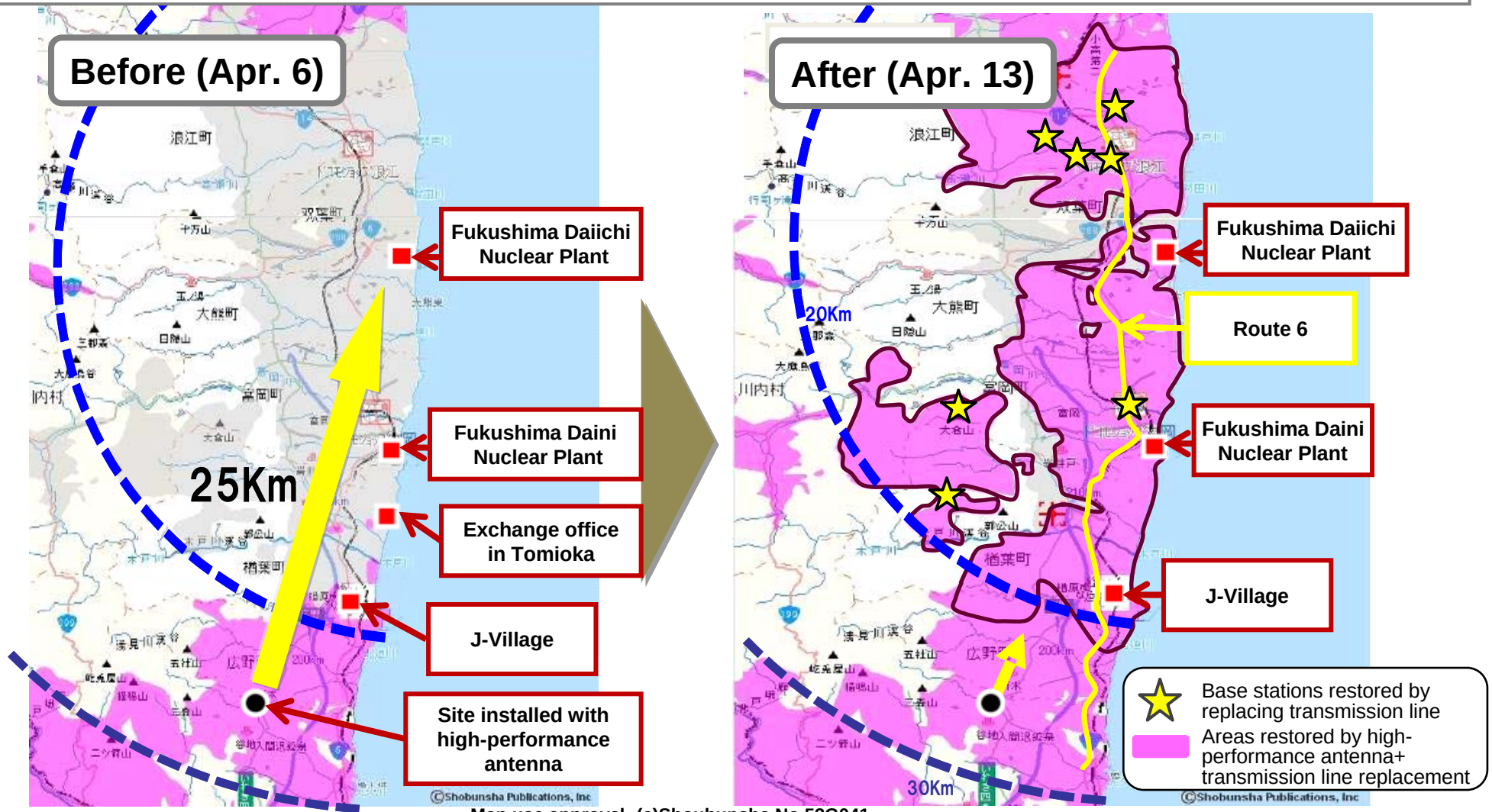
Iwaki, Fukushima: 25 km away from Fukushima Power Plant

Replaced transmission line of base station

Tomioka, Fukushima

Restoration of Areas within 20km from Fukushima Power Plant

- **Restored coverage in areas within 20km radius from Fukushima Daiichi Nuclear Plant and along Route 6 (the access route to the power plant)**



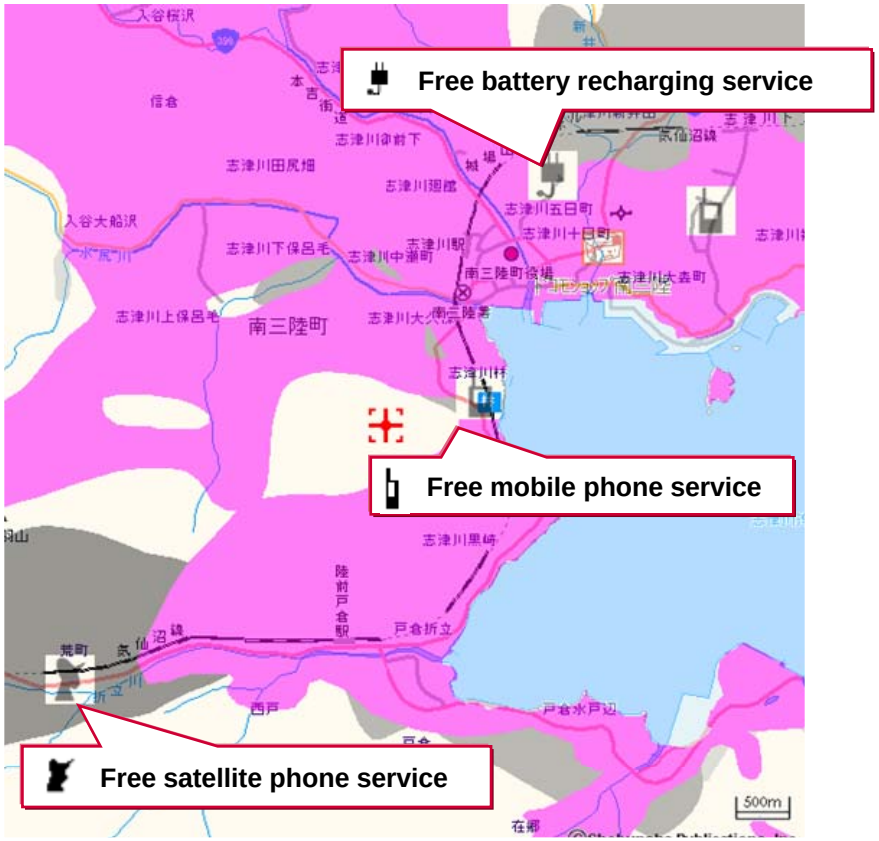
Map use approval: (c)Shoubunsha No.53G041

“Restoration Area Maps”

Easy-to-read maps indicating in different colors the areas where service is available or disrupted, and the restoration schedule of disrupted areas

- Areas where service is available
- Areas restored by mobile base station vehicle
- Areas to be restored by mobile base station vehicle
- Areas where service is disrupted (to be restored by Mid-Apr)
- Areas where service is disrupted (to be restored by Mid-Late Apr)
- Areas where service is disrupted (to be restored after May)

Mar. 21, 2011



Apr. 4, 2011

Map use approval: (c)Shoubunsha No.53G041

New Disaster Preparedness Measures

(1) Securing communication in key areas

Secure means of communication for densely populated areas/ administrative organizations

1. Deploy large-zone base stations across Japan (approx. 100 locations)
2. Promote use of uninterruptible power supply systems and ensure 24-hour autonomous power supply in base stations (Approx. 1,900 stations)

(2) Swift response to disaster-stricken areas

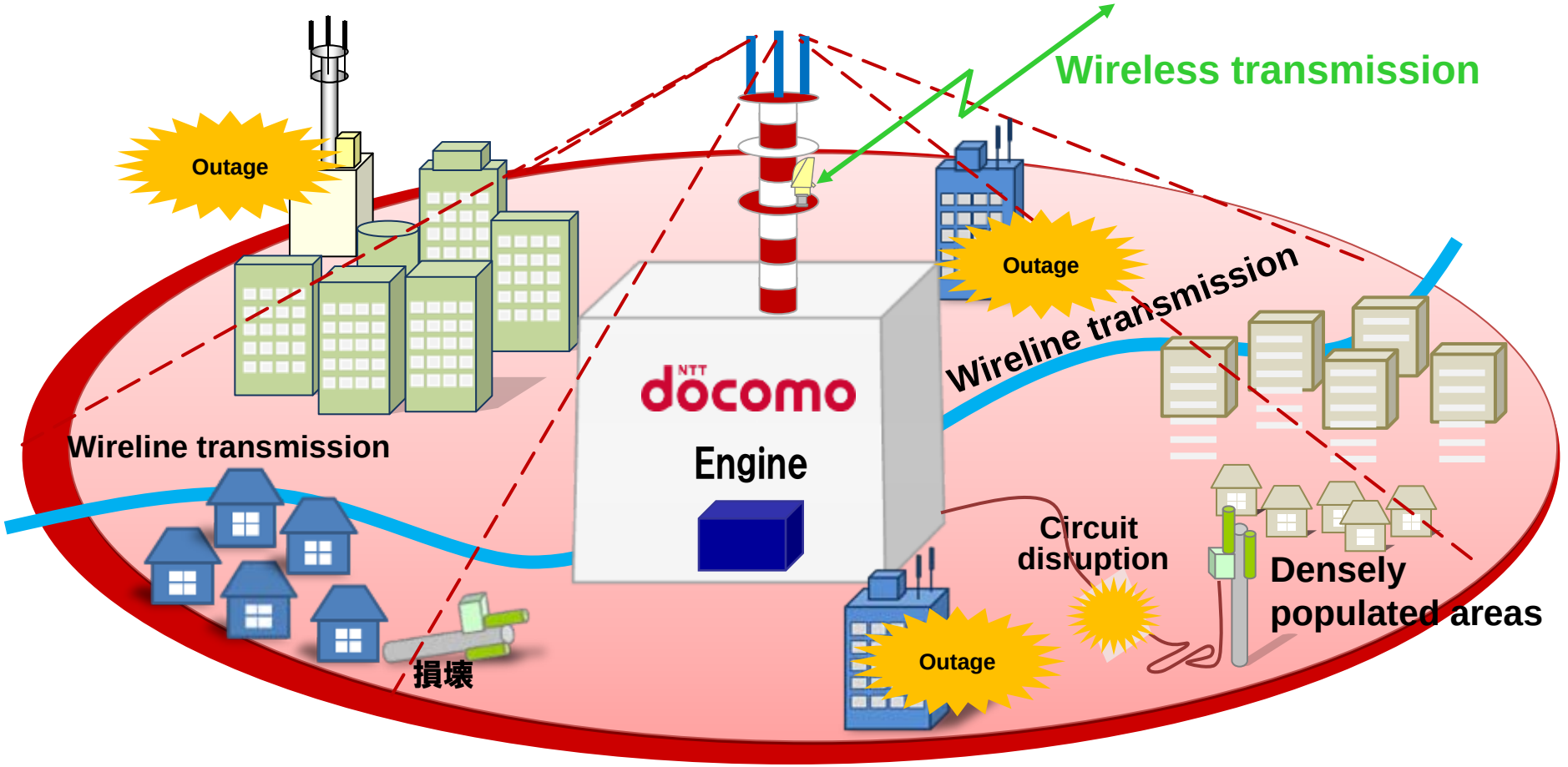
3. Swift provision of satellite mobile phones (3,000 units)
4. Quick construction of service areas using satellite system
5. Flexible area construction using microwave entrance circuits (100 sections)

(3) Further improvement of customer convenience in disasters

6. Development of disaster voice message service
7. Enrichment of “Restoration Area Maps”
8. Support of voice guidance in “Disaster Message Board” service for improved ease of use
9. Further utilization of “Area Mail”
10. Further utilization of ICT through convergence with SNS, etc.

Deployment of Large-Zone Base Stations

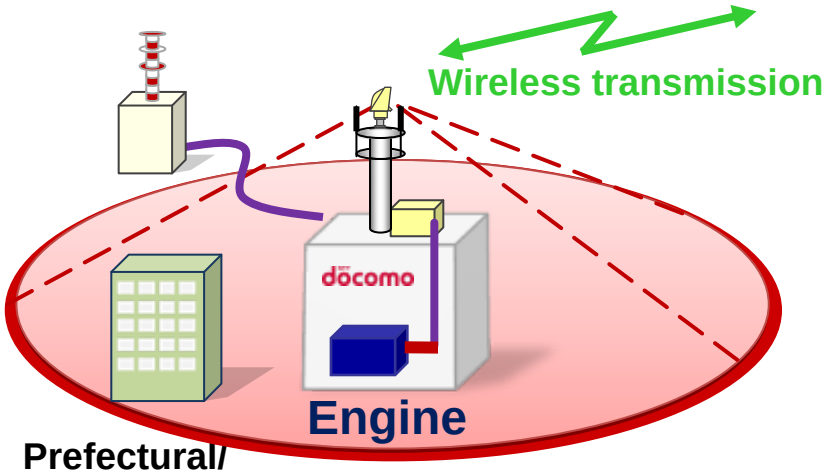
• Newly construct base stations using large-zone scheme separately from ordinary base stations to secure communications in densely populated areas in the event of a wide-area disaster or power outage (approx. 100 locations across Japan)



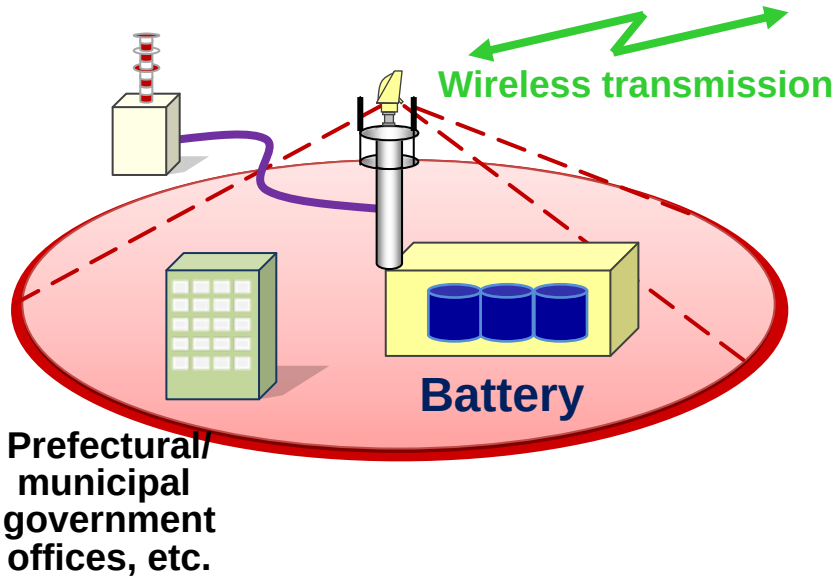
Uninterruptible Power Supply/24-Hour Battery Supply

•Promote use of uninterruptible power supply systems and ensure 24-hour autonomous battery supply in base stations to secure communication in prefectural/municipal government offices and other important institutions (Approx. 1,900 stations)

<Base stations in DOCOMO buildings, etc.>
Engine-driven uninterruptible power supply (Approx. 800 stations)



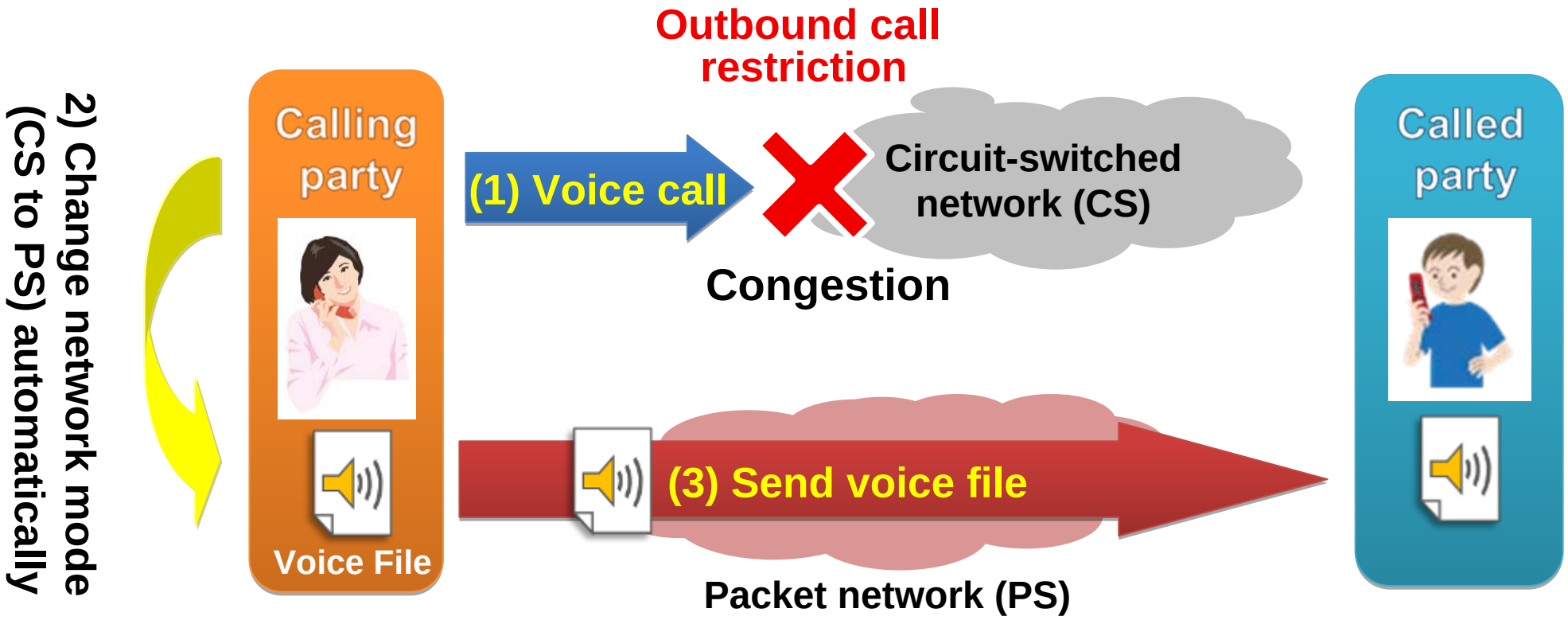
<Tower base stations>
24-hour battery supply (Approx. 1,100 stations)



Development of Disaster Voice Message Service

- **Develop a service that efficiently carries voice message to the destination after converting them into voice files, because voice calls are difficult to get through in the event of a disaster due to congestion caused by massive outbound calls**

Planned for launch in FY2011



Utilization of ICT through Convergence with SNS

- **Support retrieval of information in the event of a disaster through the convergence of mobile with SNS, etc.**

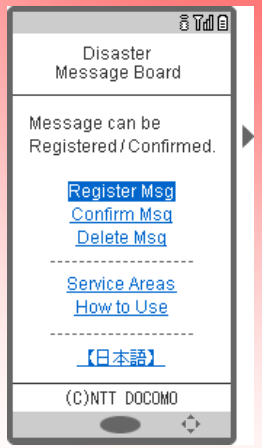
Disaster-stricken areas

Safety confirmation
Shelter information

Disseminate information

SNS/Blogs (Twitter, etc.)

Google Person Finder



DOCOMO Disaster Message Board Service

Confirm information (Safety info. etc.)

New Disaster Preparedness Measures: Financial Impact

Overview		Estimated impact	
		CAPEX	Profit/Loss
Securing communication in key areas	(1) Deployment of large-zone base stations	¥3.0 billion	¥3.0 billion
	(2) Uninterruptible power supply, 24-hour battery supply	¥14.0 billion	
Swift response to disaster-stricken areas	(3) Increase of satellite mobile phones	¥1.0 billion	
	(4) Increase of satellite entrance circuits	¥1.0 billion	
	(5) Deployment of emergency microwave entrance facilities	¥1.0 billion	
Improved convenience	(6) Provision of disaster voice message service	¥0.5 billion	
	(7) Improvement of “Restoration Area Maps”		
	(8) Support of voice guidance in “Disaster Message Board” service		
	(9) Further utilization of “Area Mail”		
	(10) Further utilization of ICT through convergence with SNS, etc.		
TOTAL		¥20.5 billion	¥3.0 billion

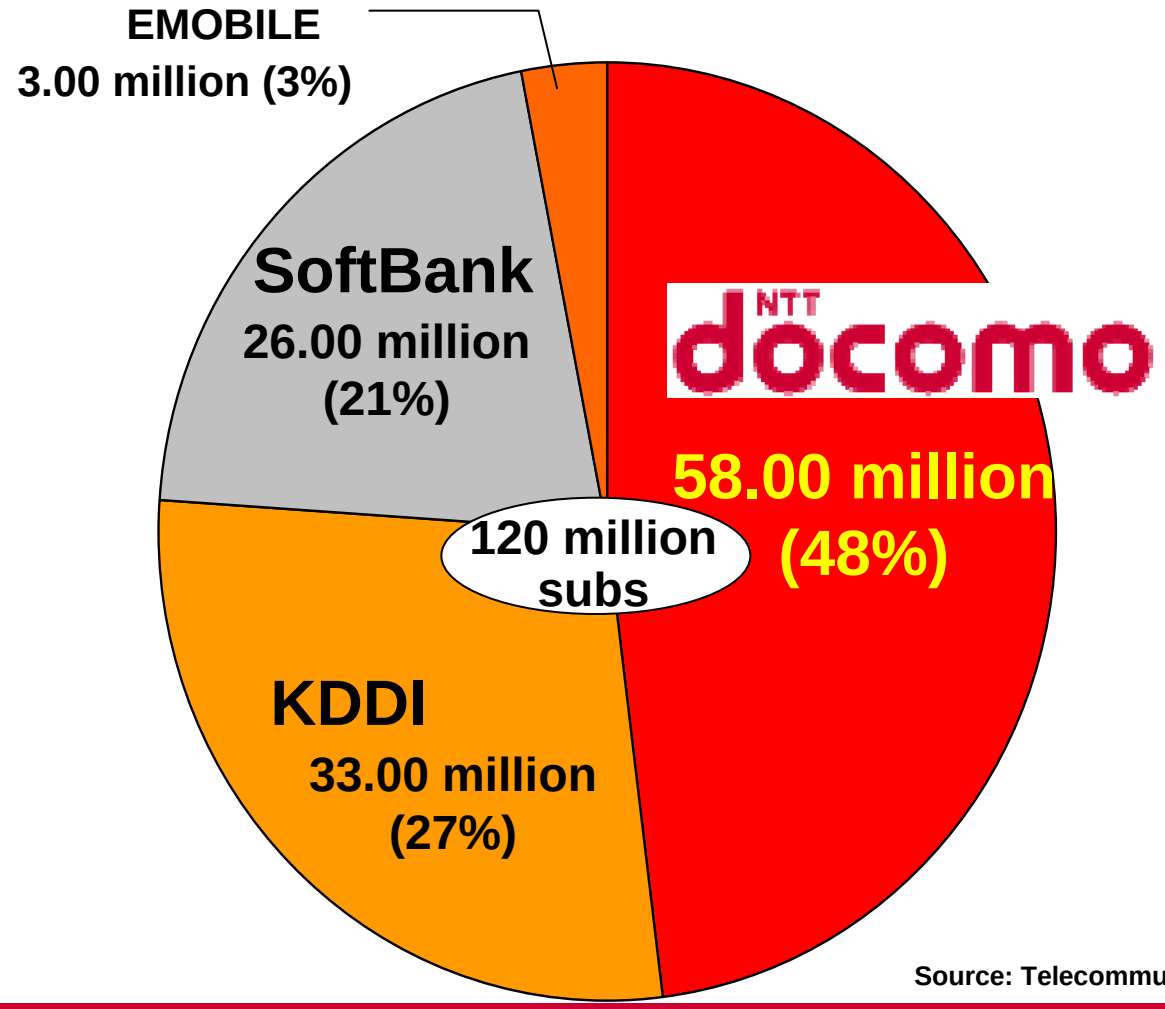
DOCOMO's Actions for New Growth

2. Recent Trends in the Mobile Market

DOCOMO's Position in Japan's Mobile Market

- **DOCOMO controls the largest market share of subscribers in Japan**

Total mobile phone subscriptions (As of April 2011)

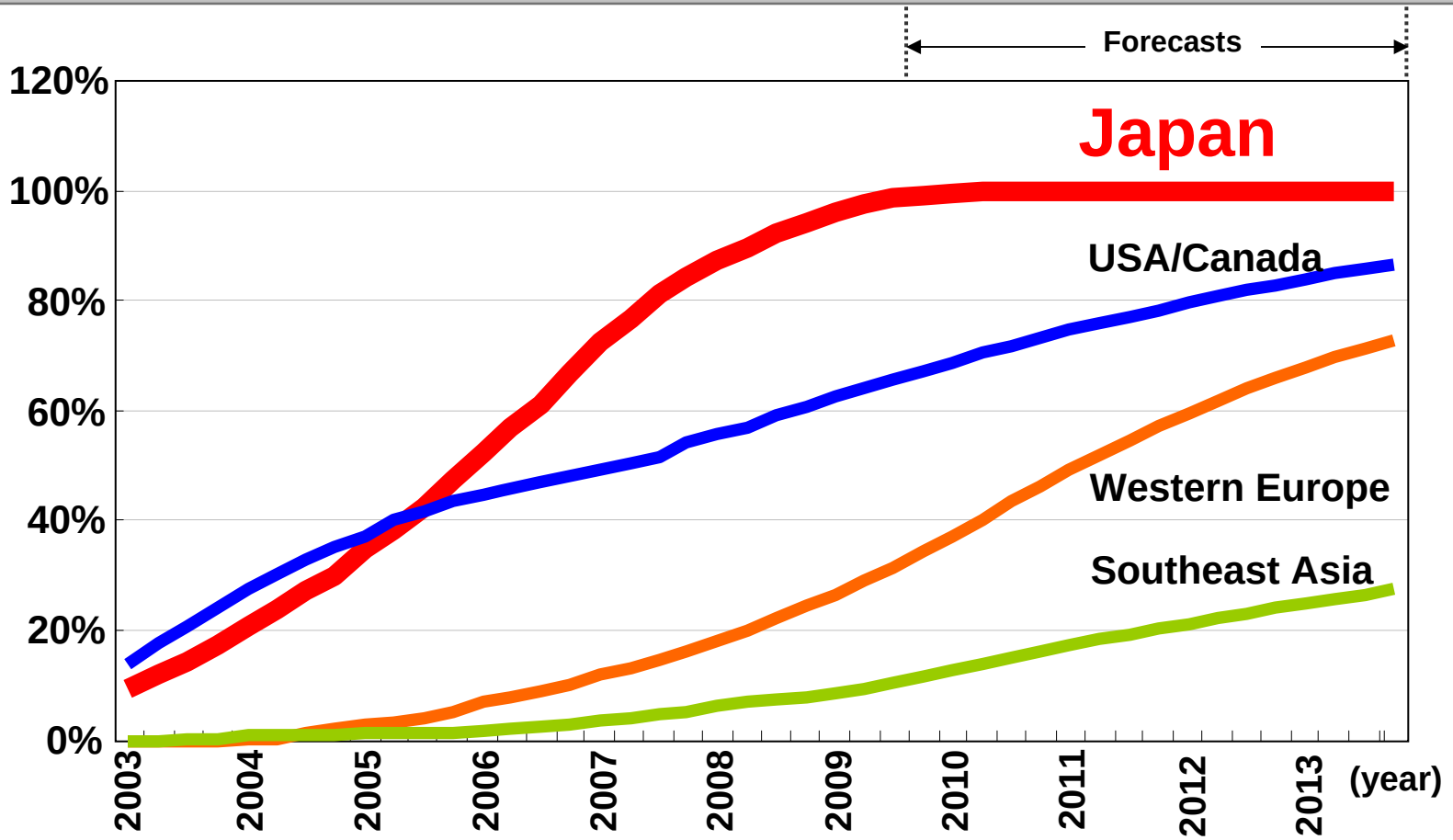


Source: Telecommunications Carriers Association (May 2011)

Japan Leads the World in Mobile Broadband

- Japan leads the world in the adoption of third-generation (3G) mobile communications service
- The widespread use of mobile broadband contributed to the development of applications

3G penetration in Japan, North America, Western Europe and Southeast Asia* (2003-2013)

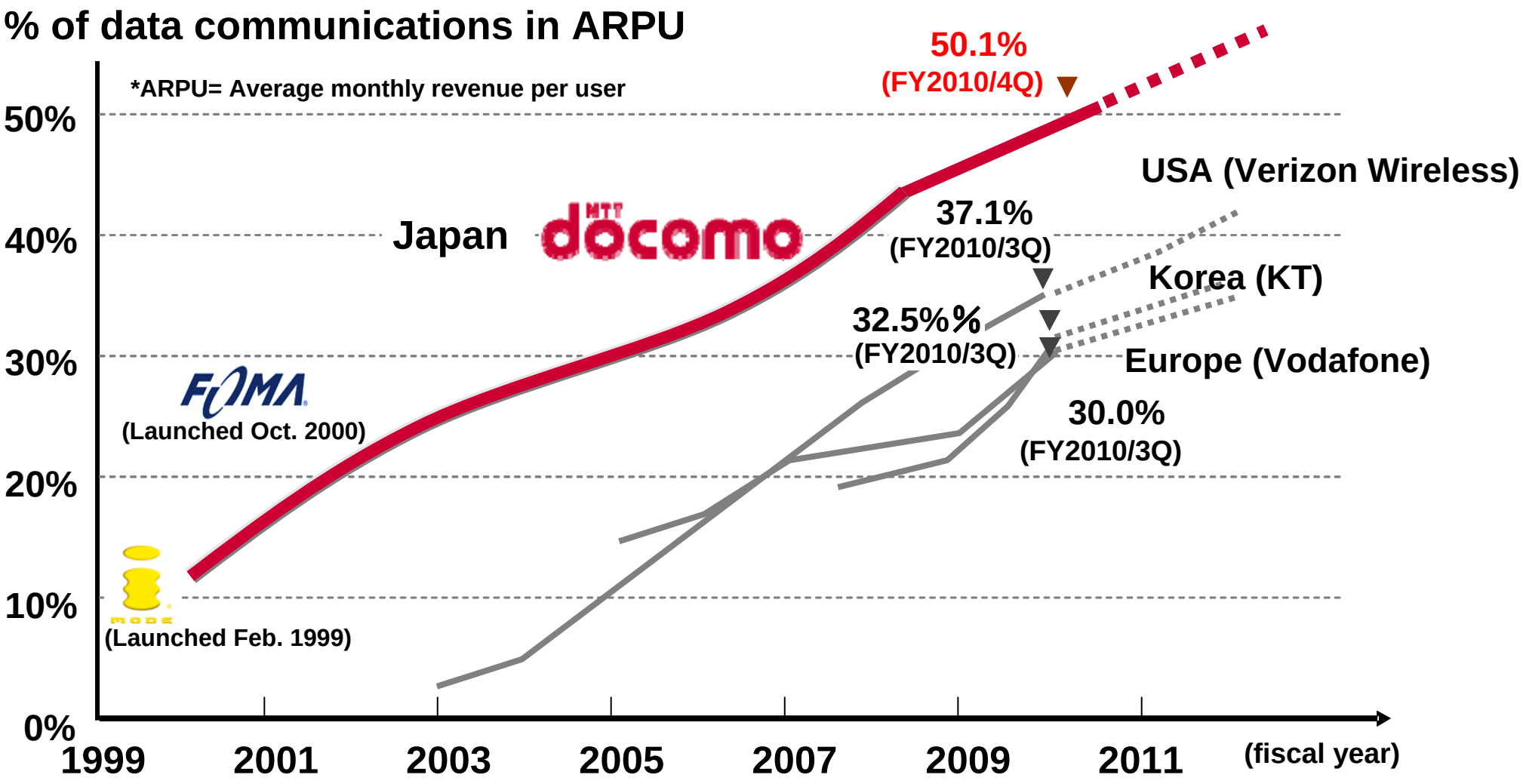


* Southeast Asia: Malaysia, Thailand, Vietnam and the Philippines

(Source): Wireless Intelligence

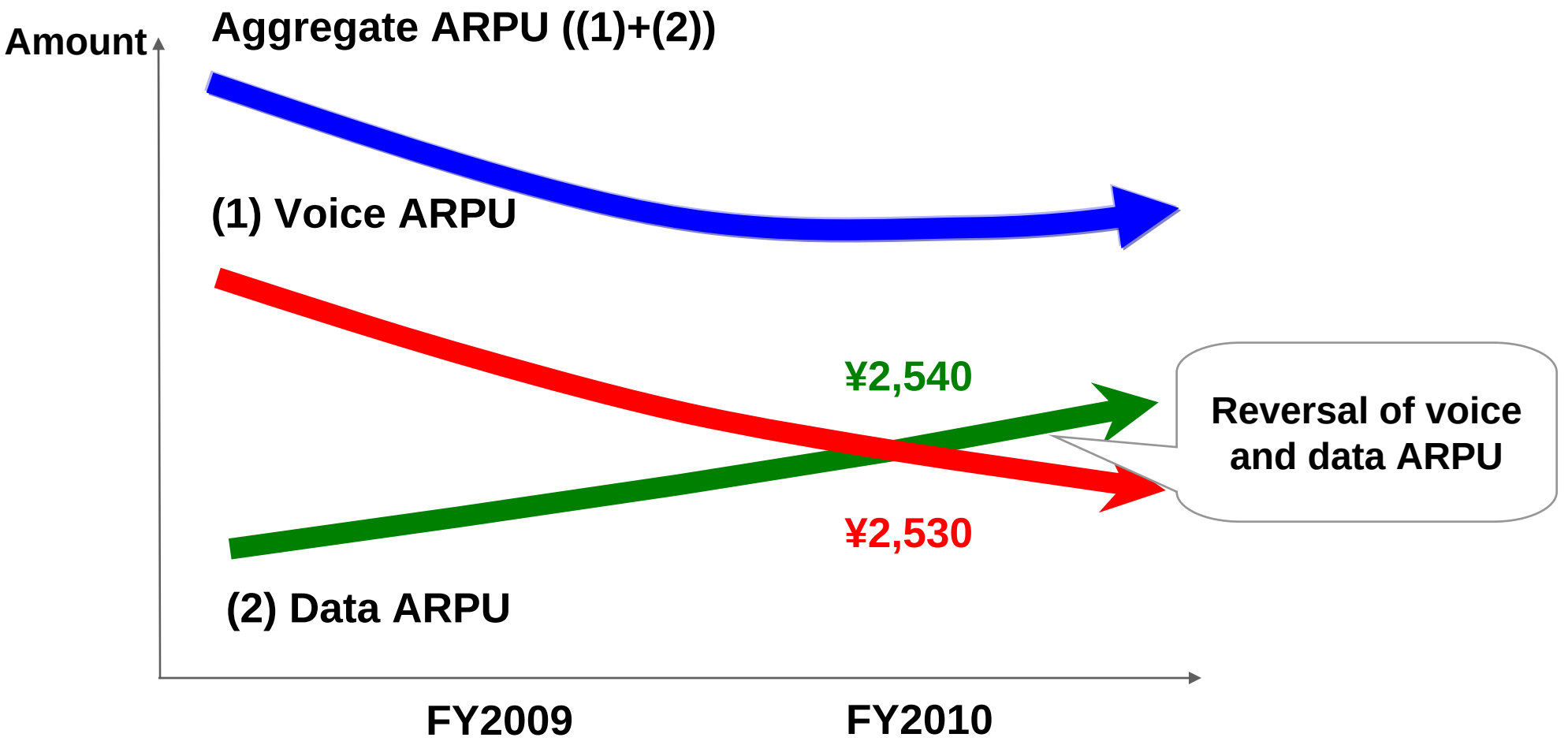
Japan Leads the World in % of Data to Total Revenues

- Japan leads the world in the % of data communications to total revenues as a result of early introduction of i-mode and other advanced services



DOCOMO's Data ARPU Growth

- **Growth of data ARPU has accelerated, with data ARPU overtaking voice ARPU in FY2010**



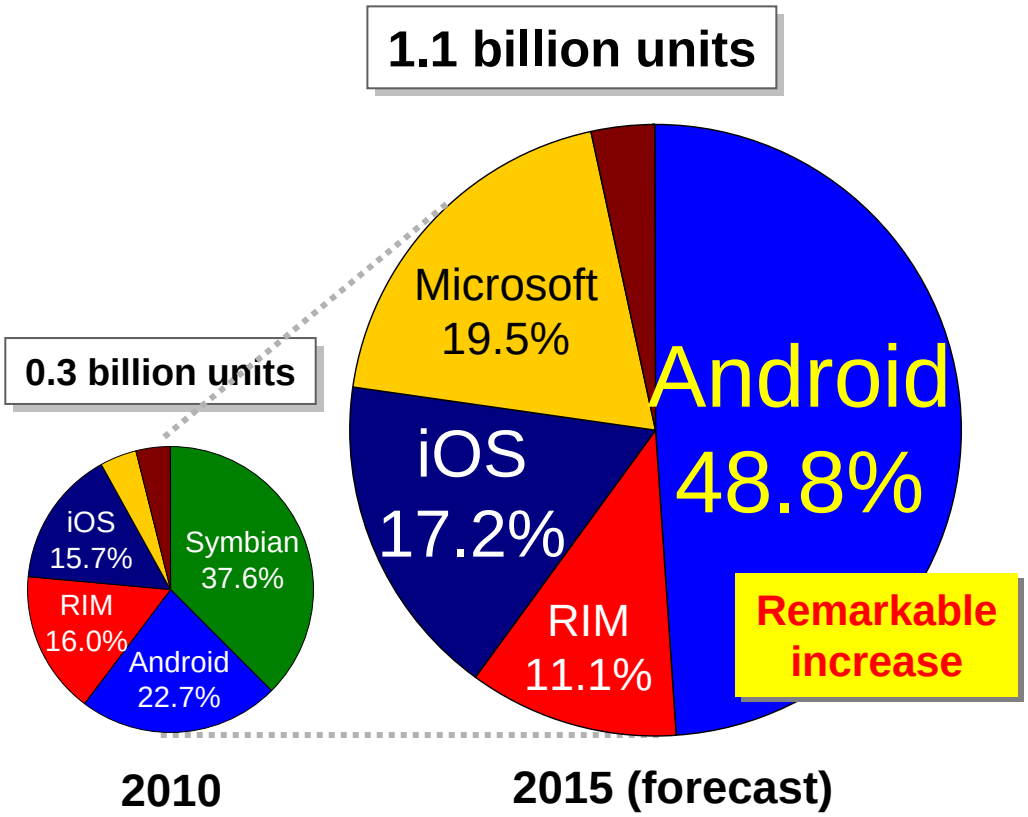
3. DOCOMO's Actions for New Growth

3-1. Promotion of Smartphones

Rapid Expansion of Smartphone Market

- **“Android OS” expanding remarkably in smartphone market**

Global smartphone market share breakdown by OS



Source: Gartner (April 2011)

■ Distinctive properties of “Android OS”

Open OS offering high scalability of functions
→ Allows delivery of various services to smartphones through functional enhancements

<Examples>
- **“Osaifu-Keitai” e-wallet**
- **One-segment broadcasting**
- **Infrared data exchange**

DOCOMO selected Android for its main OS

Smartphone Lineup

- **Prepared the finest collection of smartphones that offer “choice”, “practical benefits” and “enjoyment” with our 2011 Summer models**

2011 Summer Models: 9 smartphone models


GALAXY S II


MEDIASWP


Xperia acro


AQUOS Phone


F-12C

P-07C


Optimus bright


AQUOS PHONE f

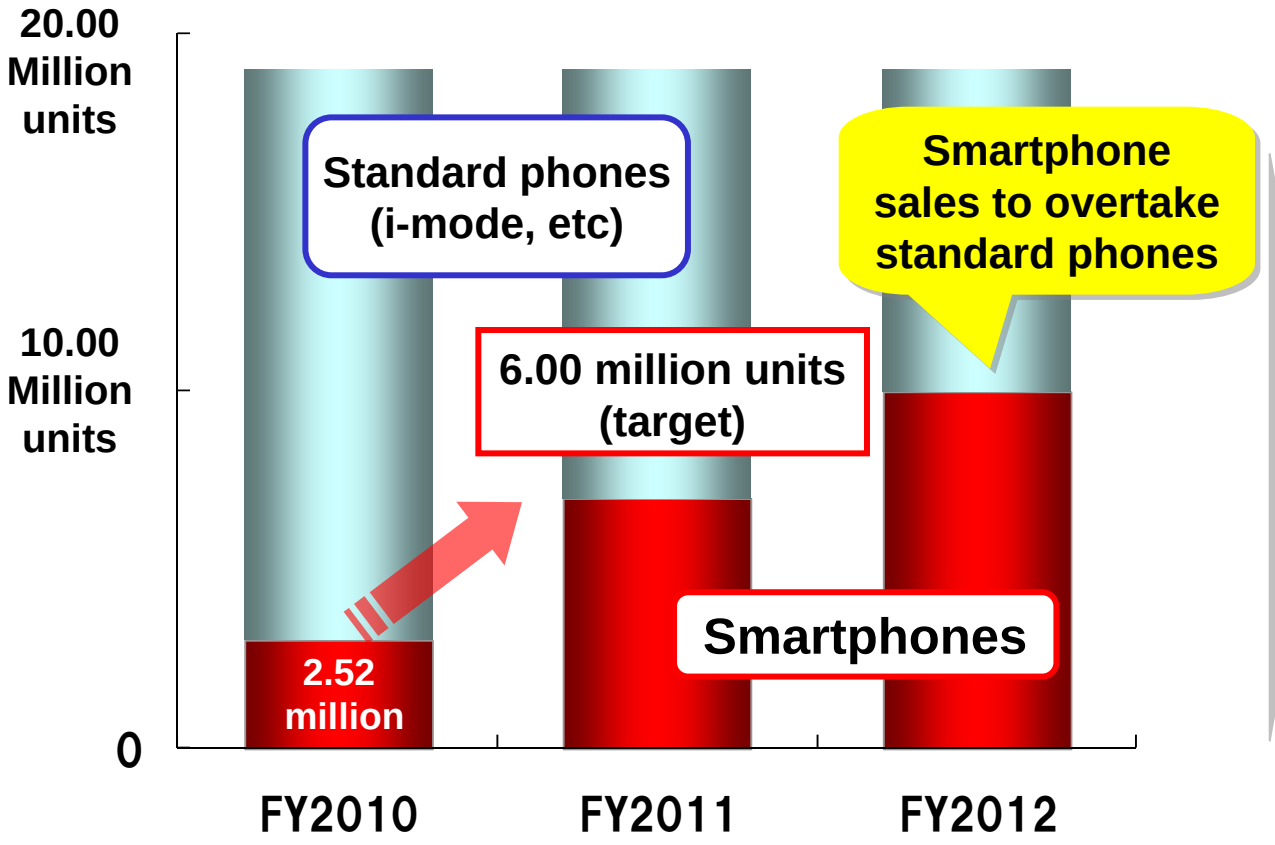

BlackBerry Bold 9780

- Android 2.3 — 8 models
- FOMA max. speed 14Mbps — 6 models
- “Osaifu-Keitai” e-wallet — 5 models
- One-segment broadcasting — 5 models
- Infrared data exchange — 6 models
- Waterproof — 3 models
- Tethering — 7 models

Smartphone Sales Promotion

- Aim to sell 6.00 million units of smartphones in FY2011
- Reviewed internal organizational structure, etc., to promote smartphone sales

■ DOCOMO's smartphone sales



■ Review of organizational structure, etc., to promote smartphone sales

- Product planning organization
- Content development organization
- Customer-front organization (increase of call center staff)
- Billing-related

Evolution of Smartphones

Past actions	2011 Summer	2011 Winter & beyond

Transplant i-mode services into smartphones

i-mode phones

Content: Music, Video, Game, Book

Smart phones

- “sp mode”/ “Osaife-Keitai” e-wallet
- “BeeTV”/Rakuten auction
- “Disaster Message Board”/ “docomo Map Navi”…etc.

- “i-channel”
- “Melody Call”
- G-guide TV program guide

- “i-concier”
- Content billing/ authentication
- “MyMenu”

- “Area Mail”

Integration of services

New services uniquely available with DOCOMO

- “docomo market”

- “docomo Palette UI”
- “docomo Connected Home”

Introduction of i-mode Billing Scheme in Smartphones

- **High-quality i-mode content to become accessible via smartphones**

Planned for launch in winter 2011

Prepare for introduction in smartphones → **From winter 2011** → **Expand smartphone content**

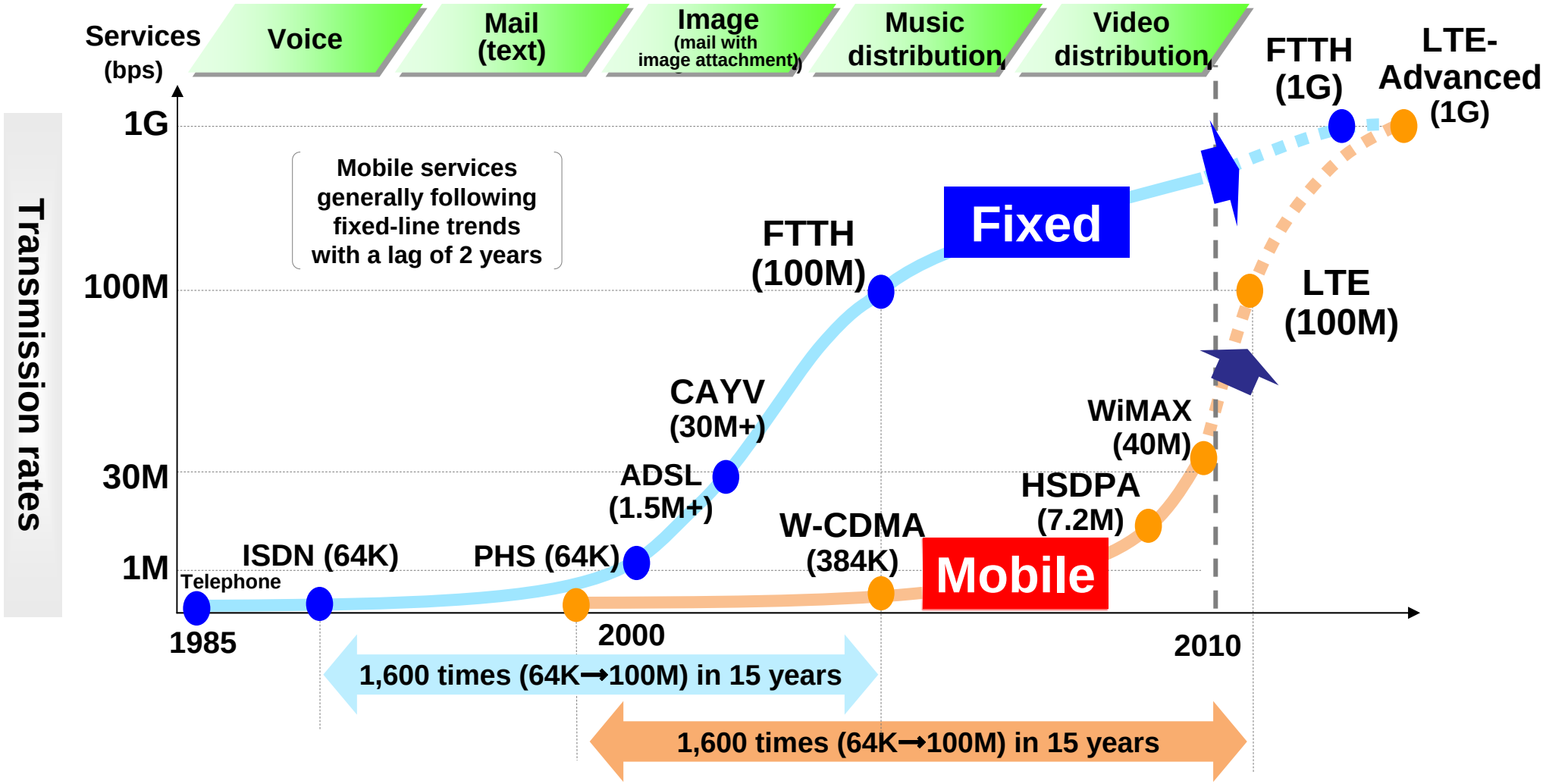
■ Introduce into smartphones i-mode billing/authentication scheme

■ Allow users to carry over "MyMenu"

3-2. Introduction of “Xi” LTE Service and Evolution of Network

Progress of Broadband

- **Transmission rates of both mobile and fixed-line networks projected to achieve an increase of approximately 1,600 times in 15 years**



Integration of Mobile Communications Systems into LTE

- LTE standardization started after DOCOMO's proposal
- Operators around the world likely to adopt LTE, leading to global integration of mobile communications system

■ LTE standardization

2004

Proposed by DOCOMO to standardization body 3GPP as an evolution of 3G system ("Super 3G" concept)

Dec. 2004

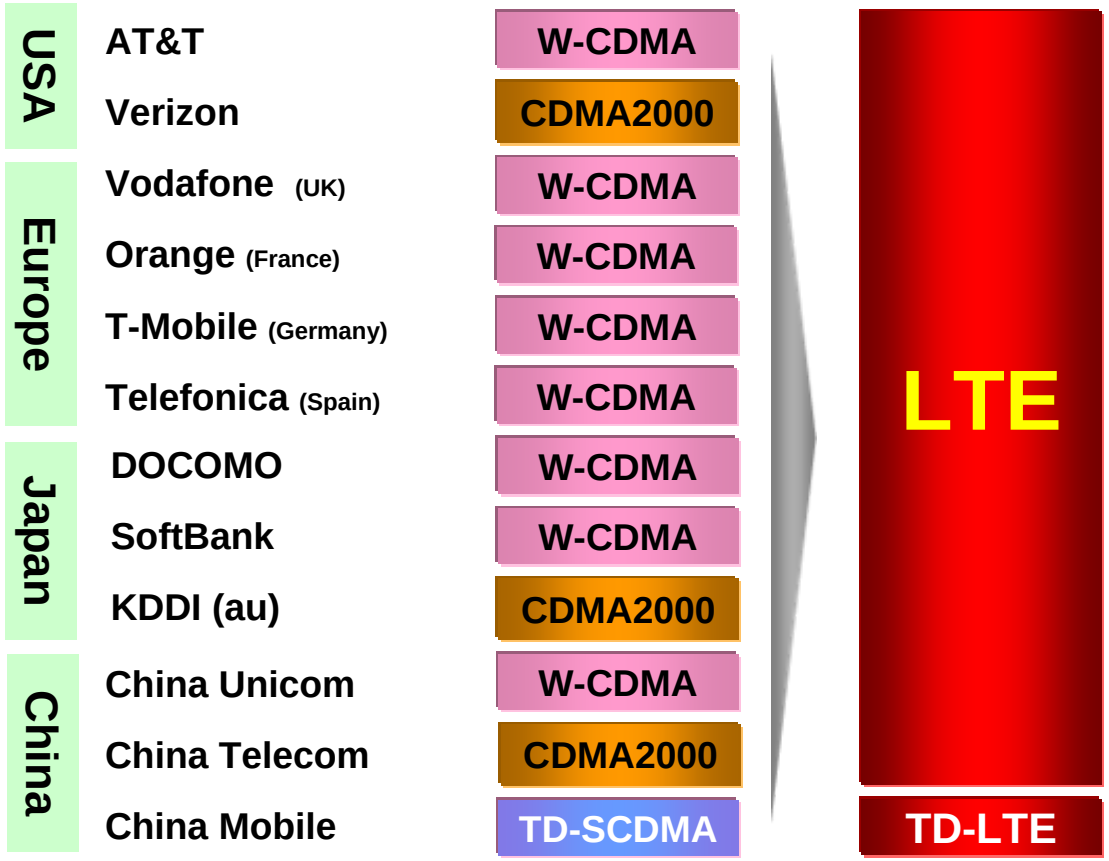
Proposed jointly by 26 companies including DOCOMO, and approved at 3GPP meeting

Dec. 2008

LTE standardization completed

3GPP: 3rd Generation Partnership Project

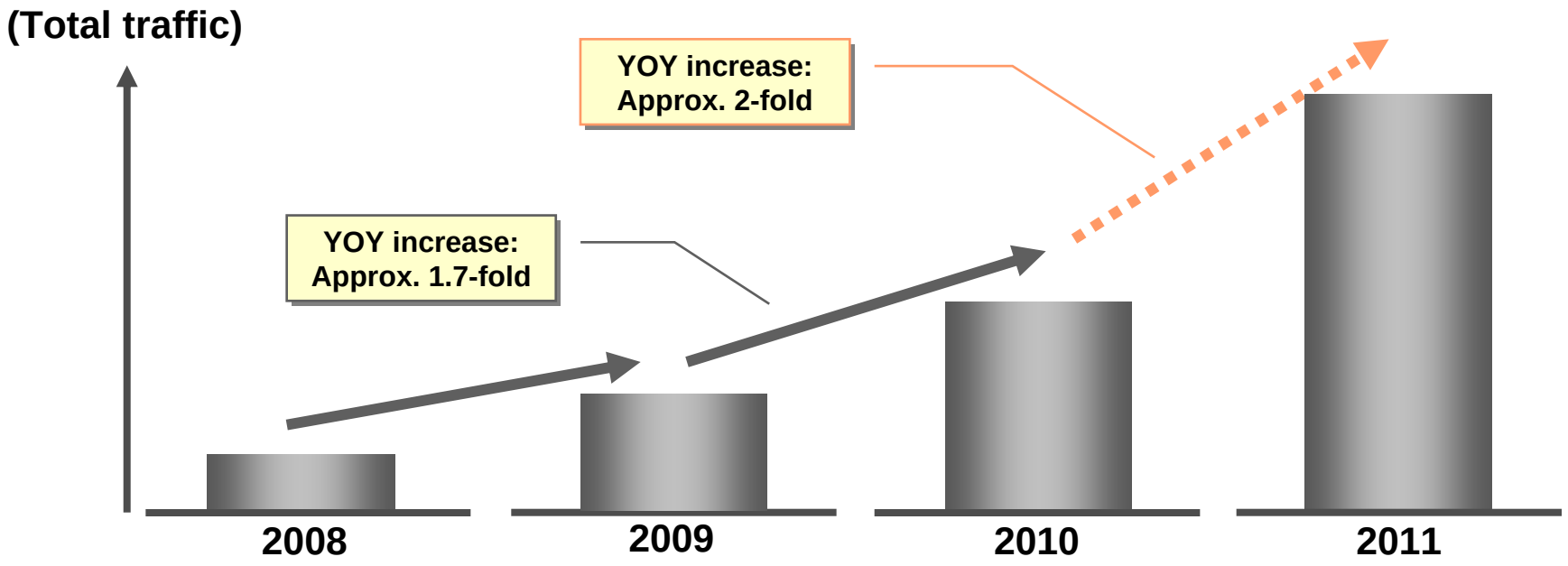
■ Systems adopted by world carriers



*Source: Extracted from newspaper articles, etc. Inclusive of introduction plan under study

Response to Constant Growth of Packet Traffic

- **Aim to accommodate constant growth in traffic by maintaining/improving our network quality through the introduction of LTE**



“Xi” (“crossy”) LTE Service Launch【Demo at Exhibition】

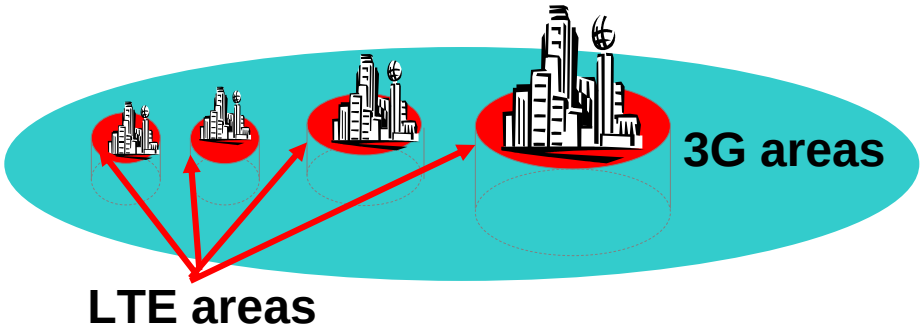
- Commercial service launched on Dec. 24, 2010
- Plan to deliver various new services leveraging LTE’s “high-speed” “large-capacity” and “low-latency” transmission capabilities

■ Distinctive features of LTE

High-speed	Large-capacity	Low-latency
Transmission rate	Spectral efficiency	Transmit latency (Max. effect)
Approx. 10-fold*	Approx. 3-fold	Approx. 1/4

(When compared to FOMA (HSPA) service)

LTE coverage to be expanded using an overlay approach to existing 3G areas



■ Service brand/logo

Xi (pronounced “crossy”)

■ Devices (data-only)

▶ Max. downlink speed: 75Mbps

USB type

ExpressCard type

New

New

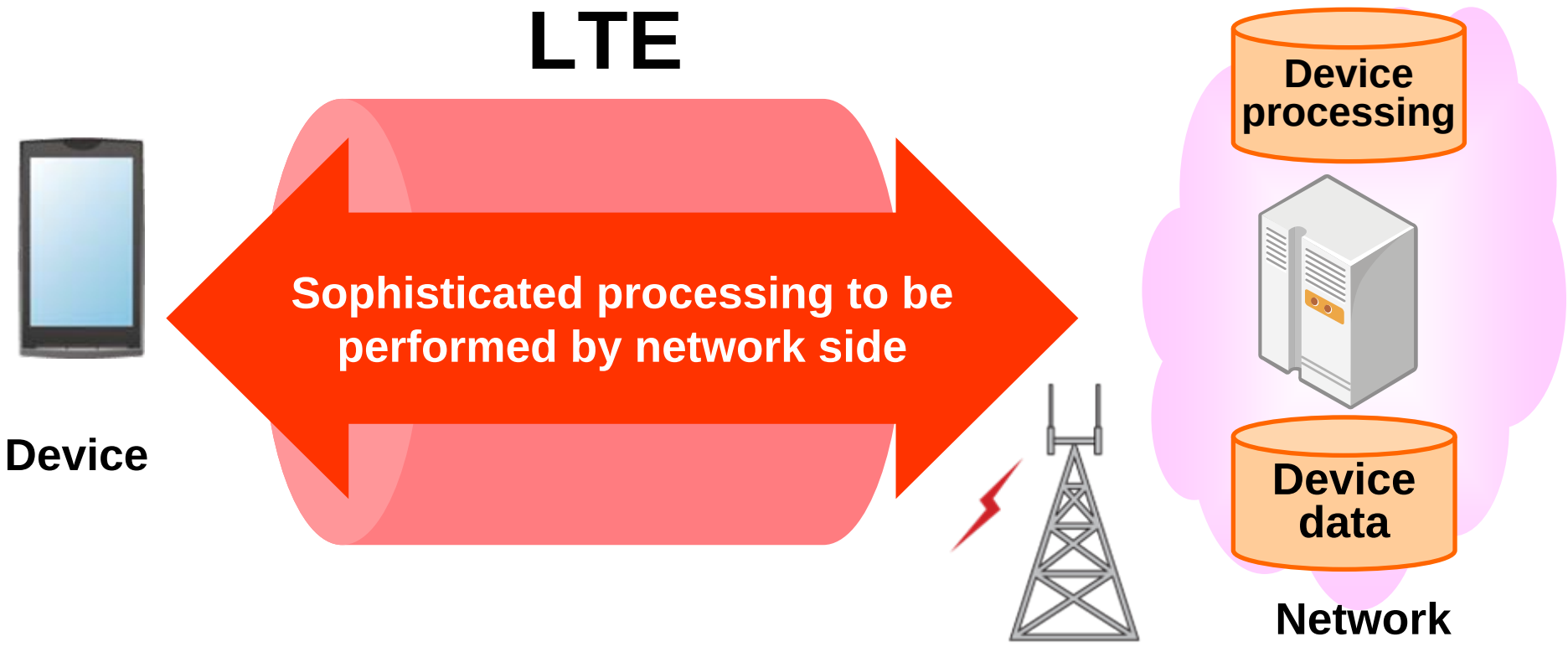
Mobile Wi-Fi router type

* Comparison between HSPA max. downlink speed of 7.2Mbps and LTE max. downlink speed of 75Mbps

Collaboration between Devices and Network

- **The most distinctive characteristic of LTE, “low-latency”, enables the provision of various “first-of-its-kind” services**

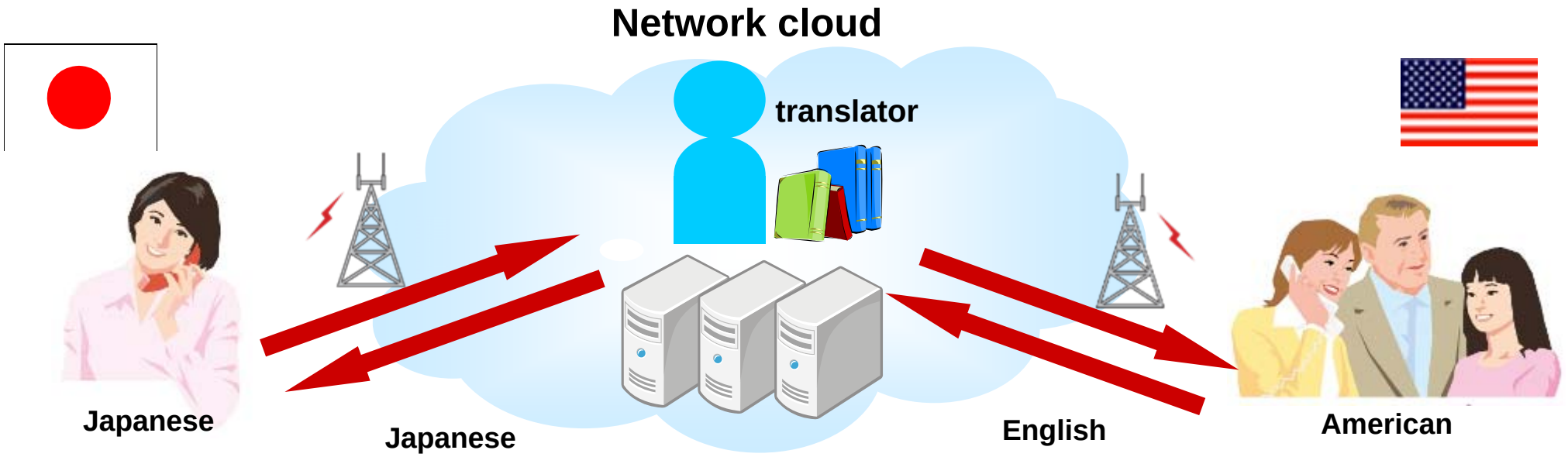
Enables advancement of services beyond the conventional limitation of implementation load in devices



“Translator Phone” Service

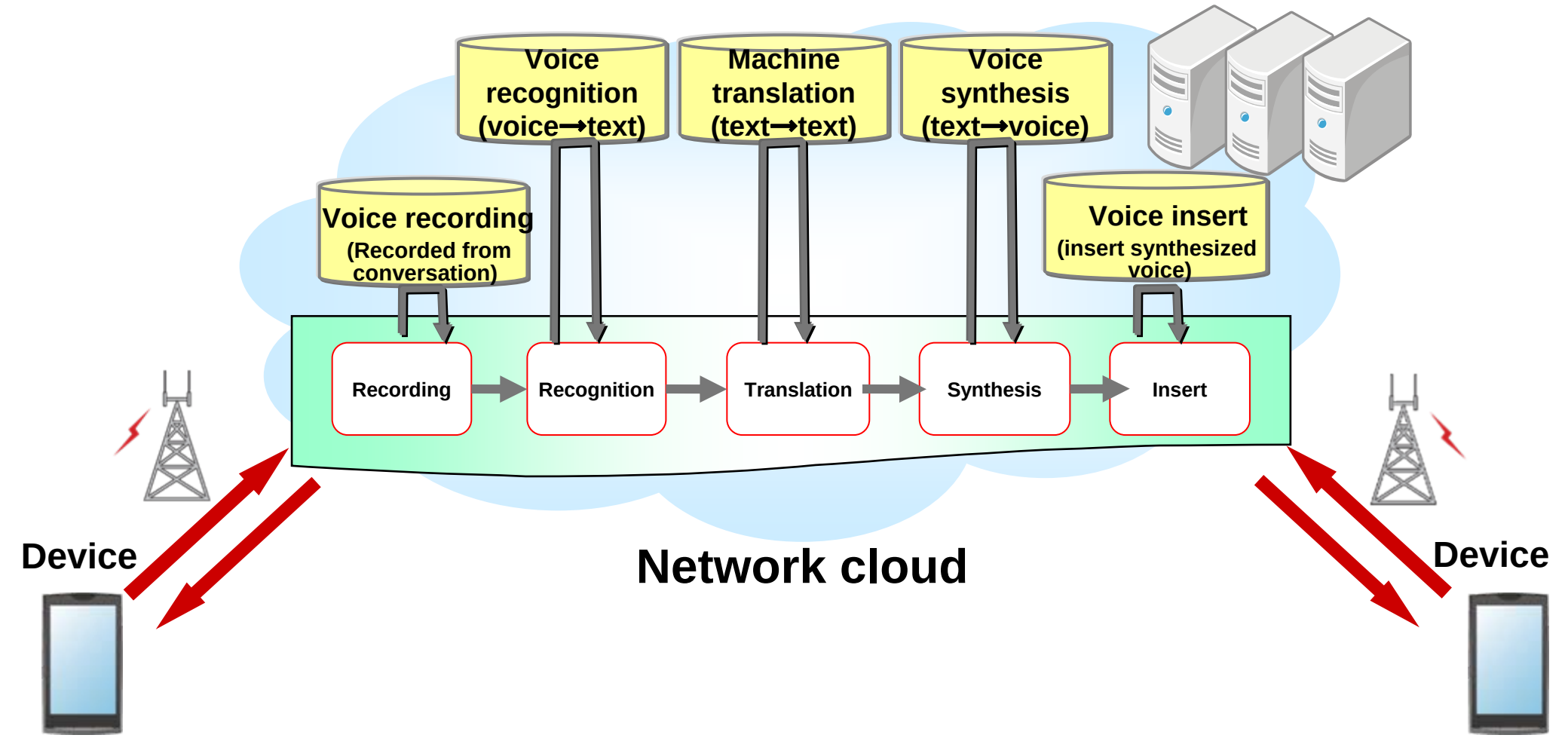
- **Makes it possible for the user to communicate in native language in a conversation with another person using a different language as if there is a translator in the network**

Trial service with monitors (Planned to start in Nov. 2011)



“Translator Phone” Service: System Image

- **Makes it possible to execute high-load processing that cannot be performed by devices, by placing the translation function on the network cloud**



AR (Augmented Reality) Service

“Chokkan Navi” (intuitive navigation service)

* Provided by ZENRIN DataCom Co. Ltd.

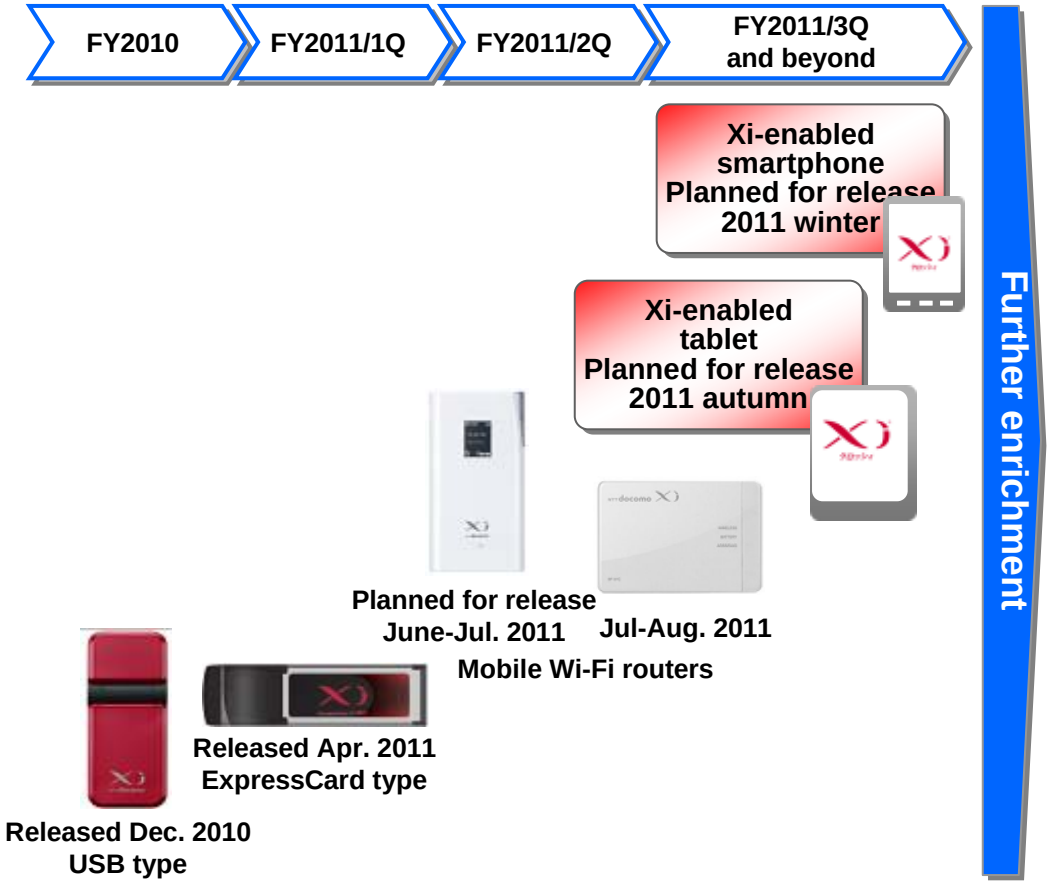
Search and display nearby shops

Navigation to desired destination

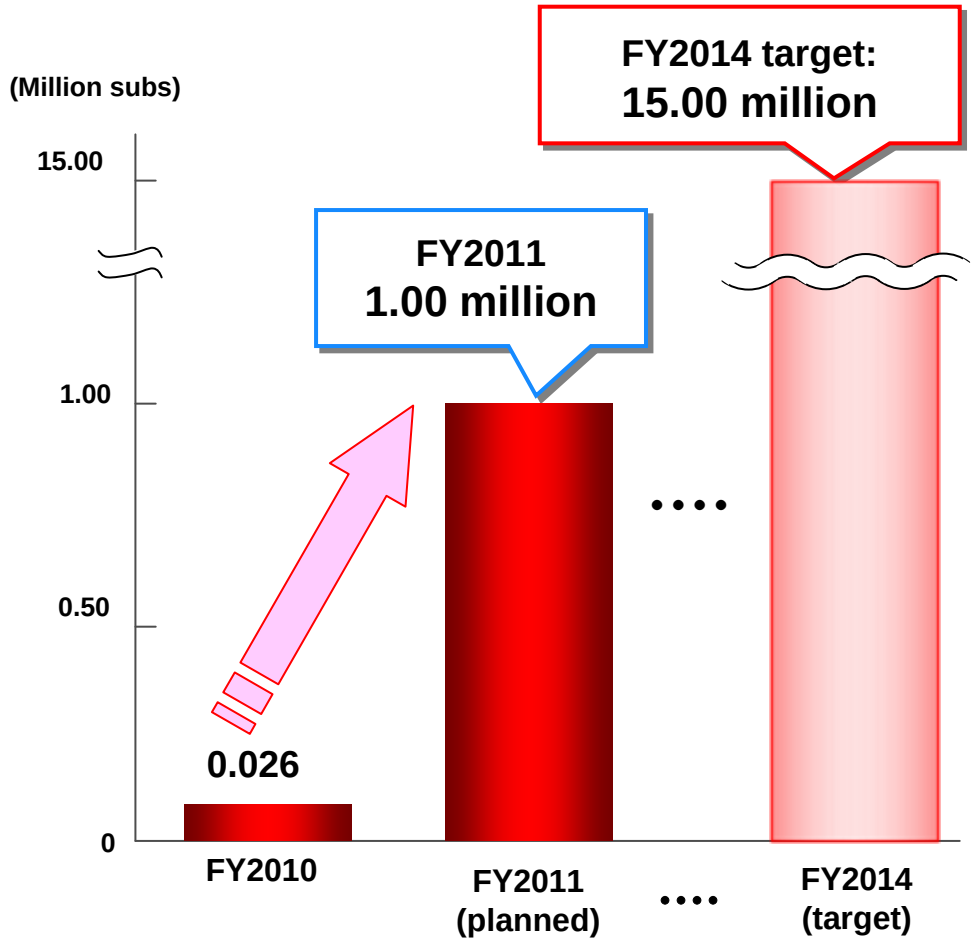
“Xi” LTE Subscriptions/Product Lineup

- Aim to grow “Xi” LTE subscriptions to over 1.00 million in FY2011 by enriching product lineup
- Plan to spend ¥300.0 billion in “Xi”-related CAPEX in the first three years

■ Enrichment of “Xi” product lineup

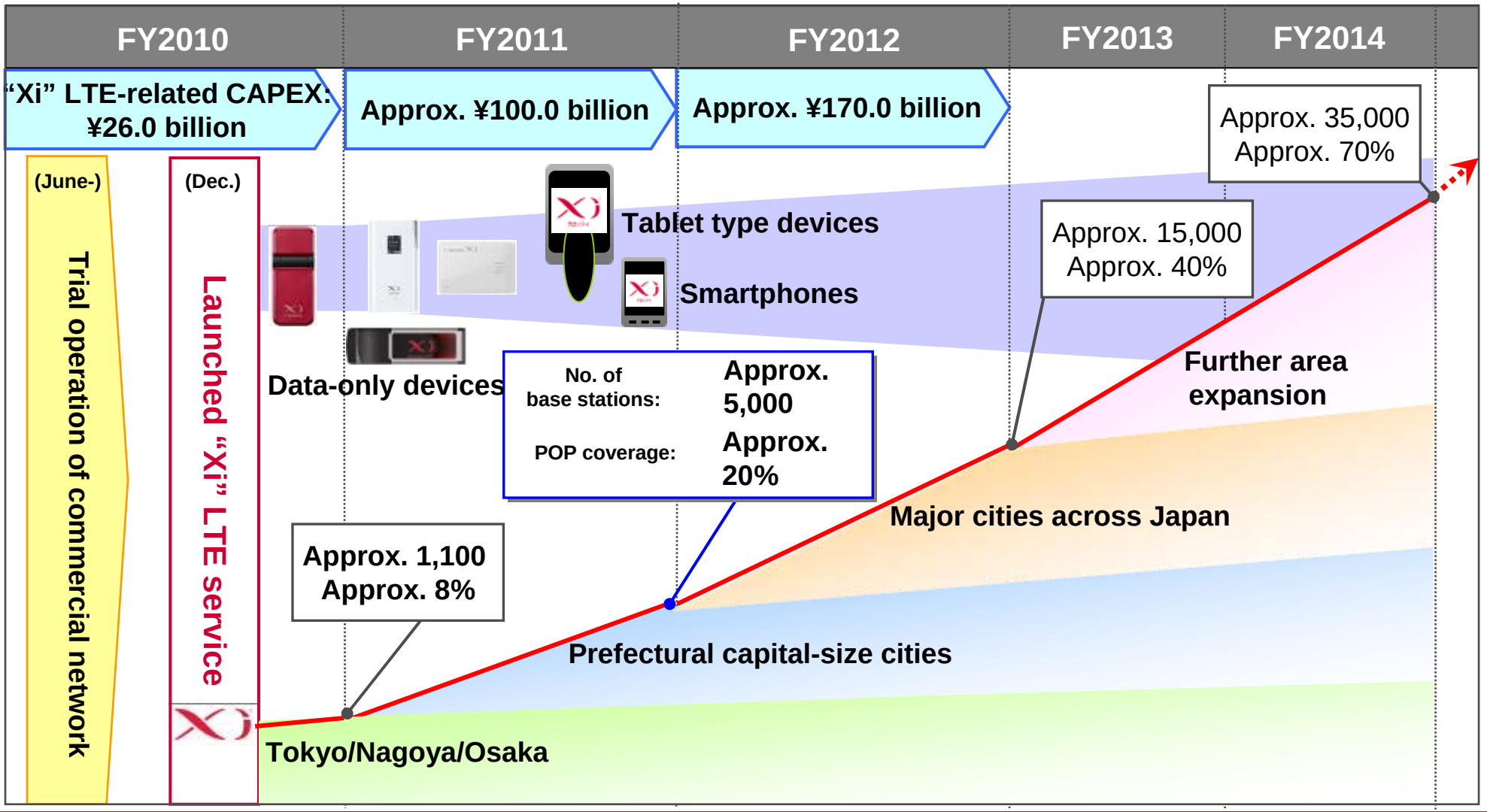


■ Projected subscriber growth (conceptual)

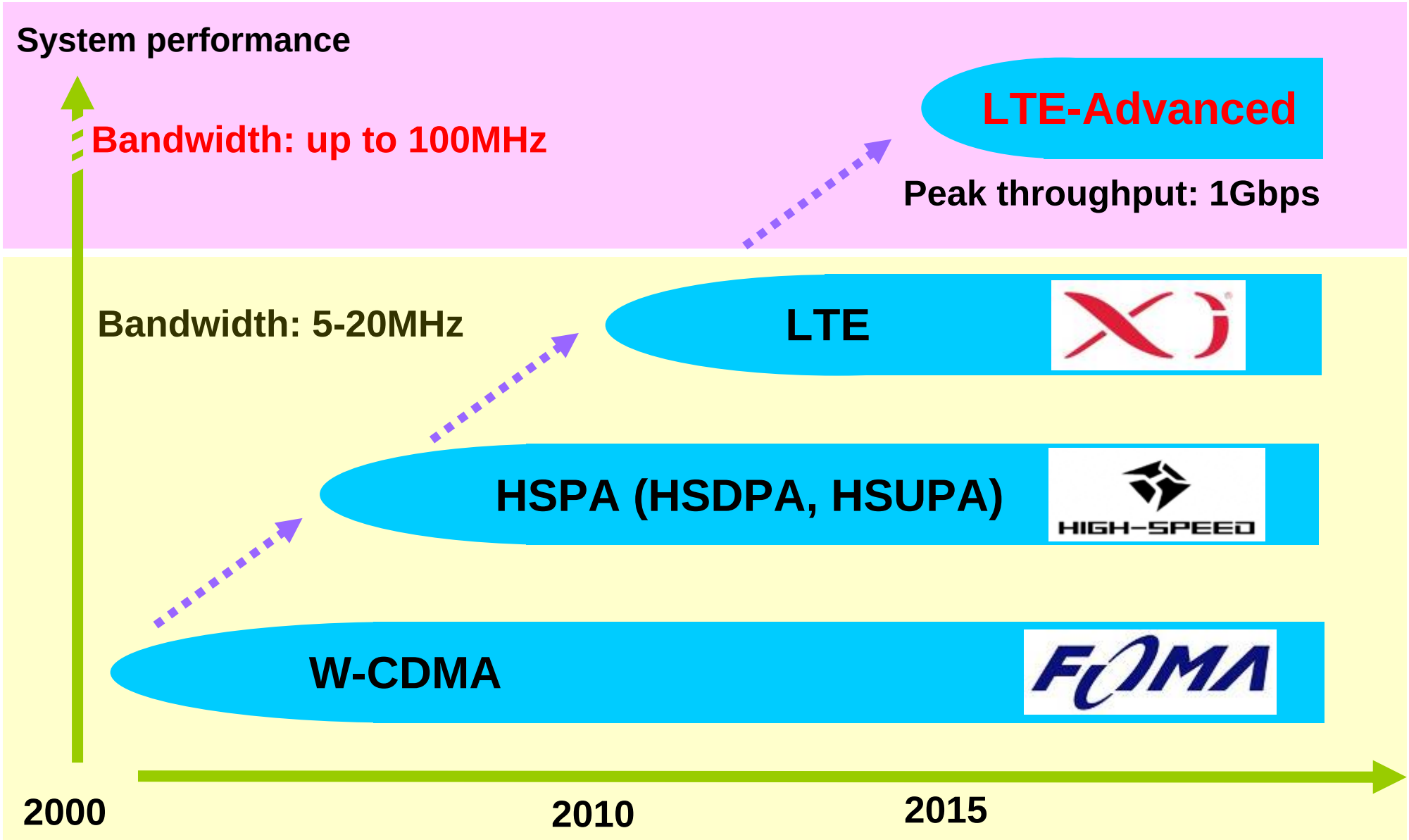


“Xi” LTE Area Expansion

- **Planned CAPEX for first three years: ¥300.0 billion**



Further Evolution of Network



Characteristics of LTE-Advanced

- A radio access system aimed for further advancement in transmission rates and capacity compared to LTE (Xi)
- Emphasizes compatibility with LTE to ensure smooth migration

■ Distinctive features of LTE-Advanced

Further speed enhancement

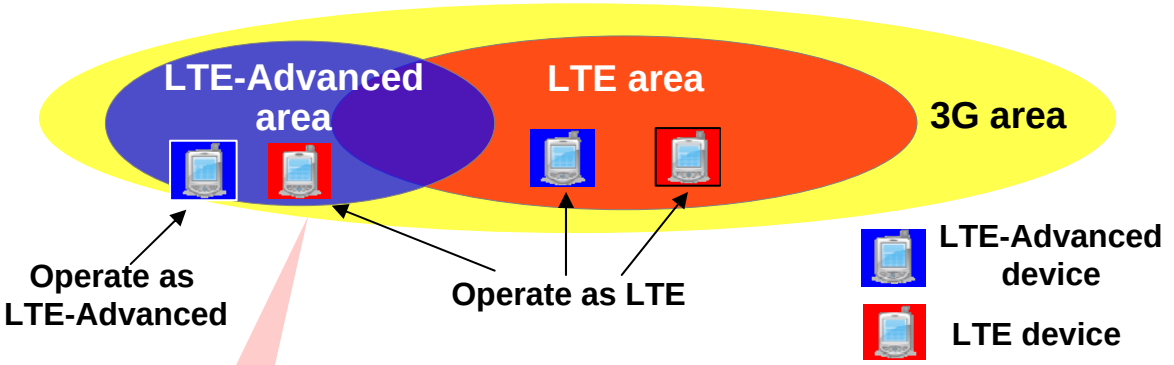
Max. downlink: **1Gbps**

Max. uplink: **500Mbps**

* More than 10 times higher compared to 75Mbps (downlink)/25Mbps (uplink) of LTE (Xi)

■ System migration (conceptual)

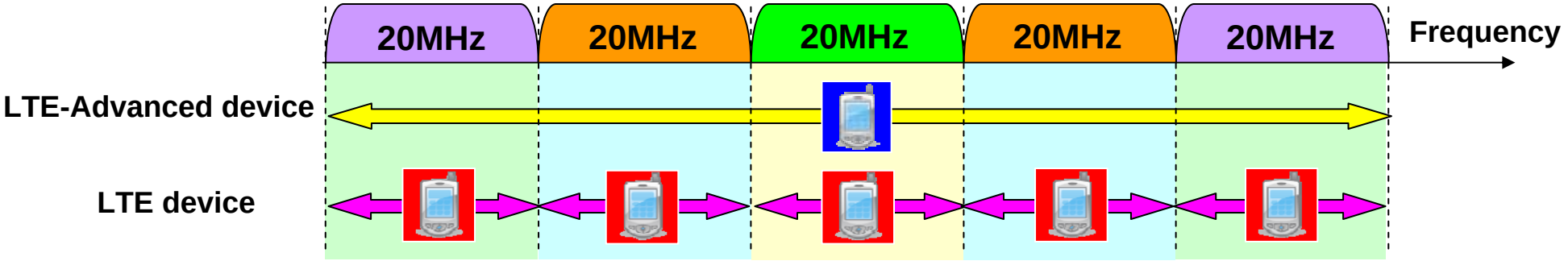
Complete development in 2015 (target)



* LTE-enabled devices can handle communication using LTE on "as is" basis even in LTE-Advanced areas

■ Wider bandwidth

Supports bandwidth of up to 100MHz by using multiple carrier frequencies

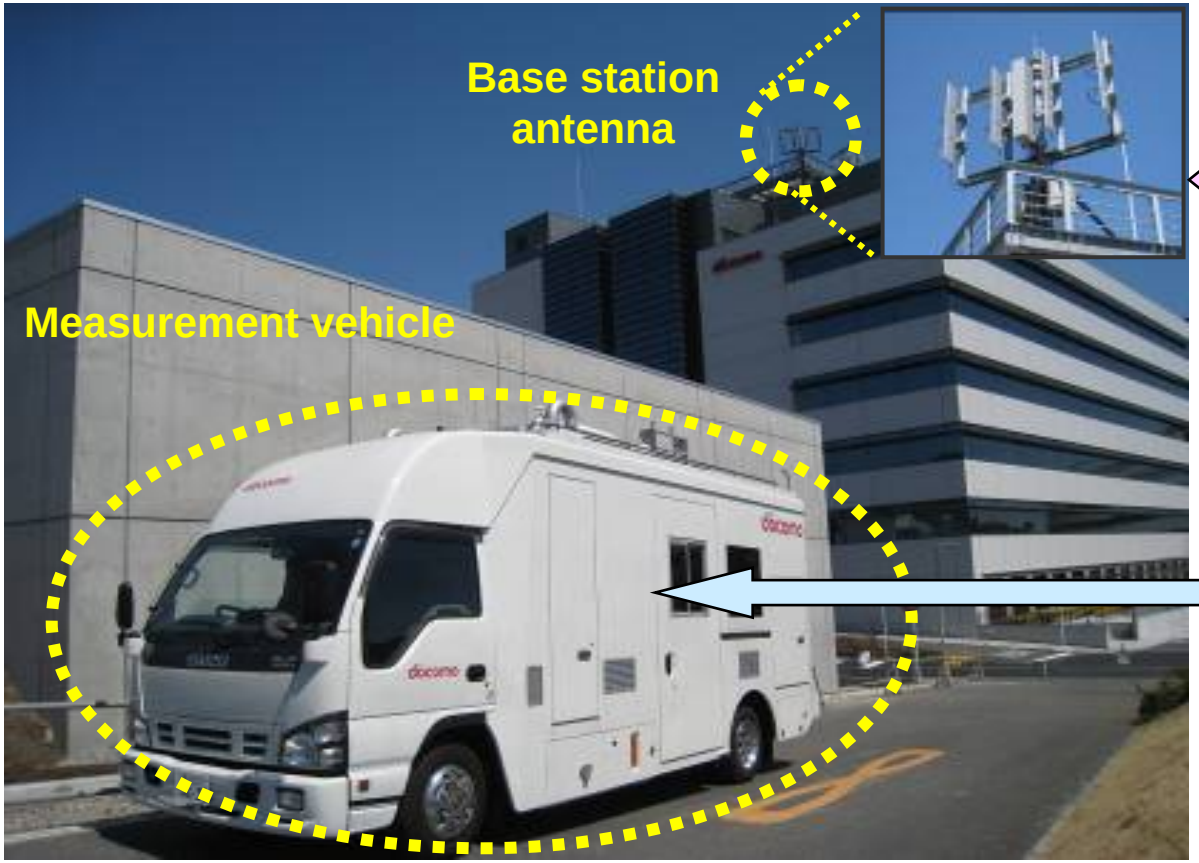


LTE-Advanced Trial

- Developed experimental system based on 3GPP LTE Release 10
- Realizes transmission rate of 600Mbps (downlink) and 200Mbps (uplink) in outdoor environments

Complete development in 2015 (target)

■ Verification trial (Outdoor experiment: image)



Base station equipment

Mobile station equipment

2X2 MIMO applied

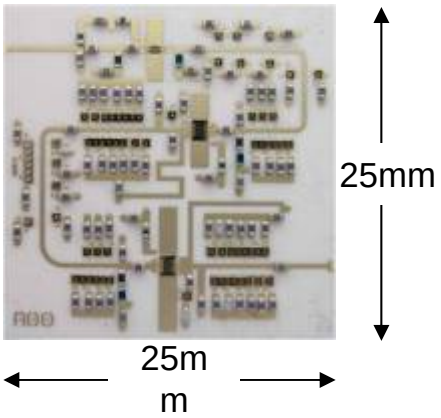
MIMO: Multiple Input Multiple Output

Multiband Power Amplifier

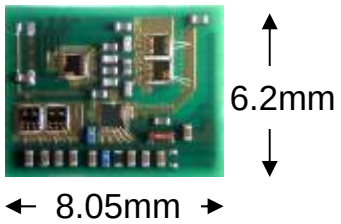
- **Developed prototype of radio circuit that is expected to contribute to globalization of mobile handsets**
  - **Multiband support: 9 bands in 0.7GHz-2.5GHz including 1.5GHz band**
  - **Multi-mode support: 3 systems of GSM, W-CDMA and LTE**

Complete development in 2013 (target)

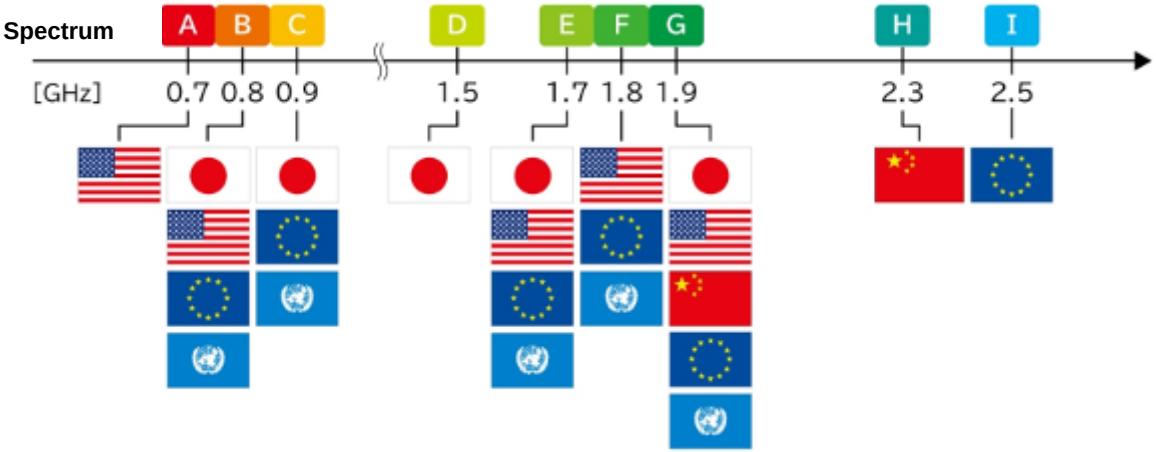
0.7GHz-2.5GHz bands



1.5GHz-2.5GHz bands



【Spectrum allocation for mobile phones in different markets】

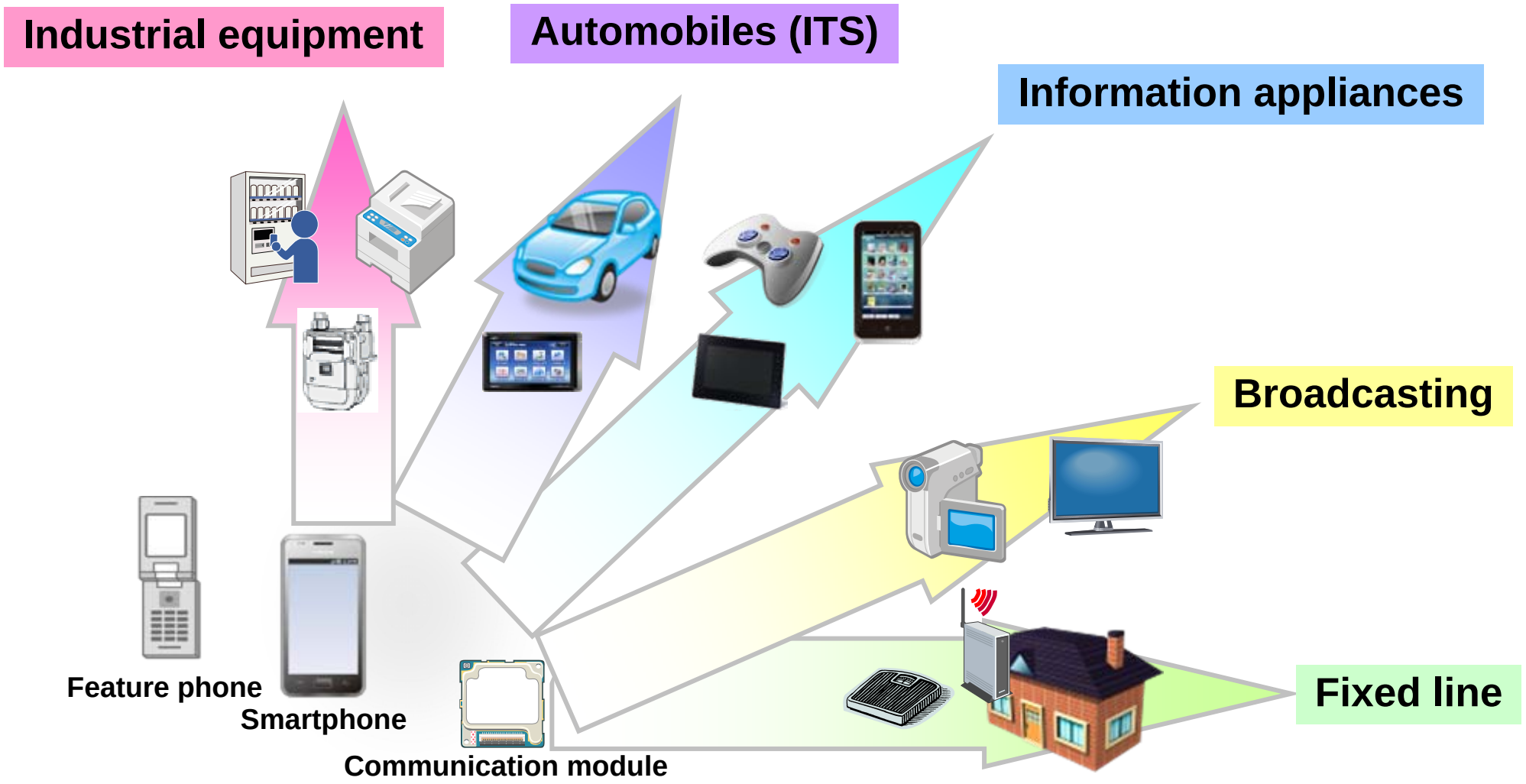


【Characteristics】
Miniaturized to a level that can be implemented in handsets, while securing performance equivalent to currently used single-band power amplifiers

3-3. Cultivation of New Business Fields

Promotion of Converged Services

- Deploy new service converging mobile phones with various life tools



Convergence with ITS (“docomo Drive Net”, Nissan LEAF)

- **Deliver various information to cars equipped with personal navigation devices (PND) or communication modules, in light of full-scale expansion in the adoption of car electronics**

“docomo Drive Net” (Exhibited)

Information delivery service to PNDs, smartphones

docomo DriveNet

- Latest map
- Traffic info.
- Latest area info.

PND

SANYO

Car-mount cradle

Pioneer

Convergence with electric vehicle

Provision of online connectivity in Nissan’s electric vehicle “LEAF”

GSMA 2011 “Global Mobile Award”

【In-vehicle IT support】

【Remote control】

Convergence with Information Appliances (E-Book Service)

- Joint promotion of electronic publishing business with Dai Nippon Printing, Co. Ltd. (DNP)
- Established joint-venture company (2Dfacto) and started full-scale service on Jan. 12, 2011

E-Book Store

Provision of approx. 20,000 content titles

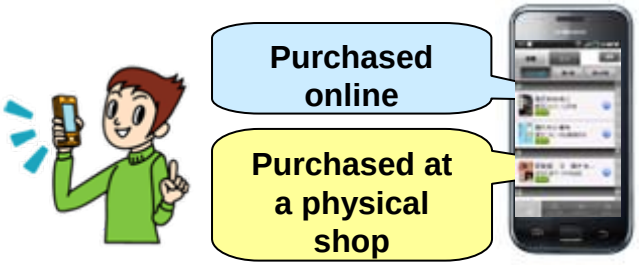
2Dfacto

Offers a wide array of content

【Future development (conceptual)】

- Coexistence of physical/digital stores -

● One-stop management of physical & electronic books (bookshelf service)



● Point sharing between physical/digital store

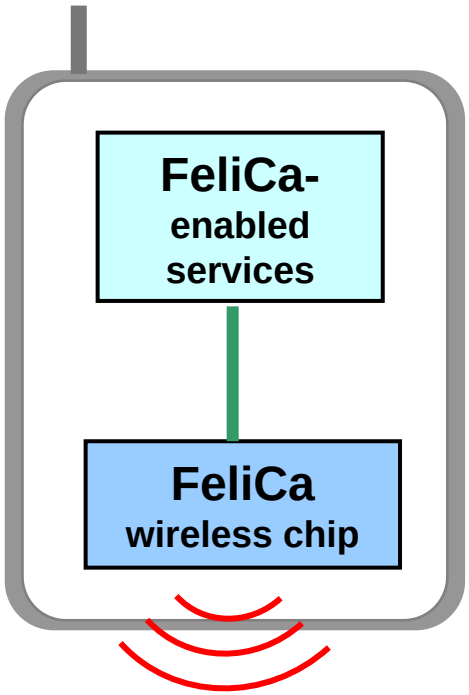
docomo×DNP

Established joint venture company (2Dfacto) with DNP.
Full-scale service launched on Jan. 12, 2011

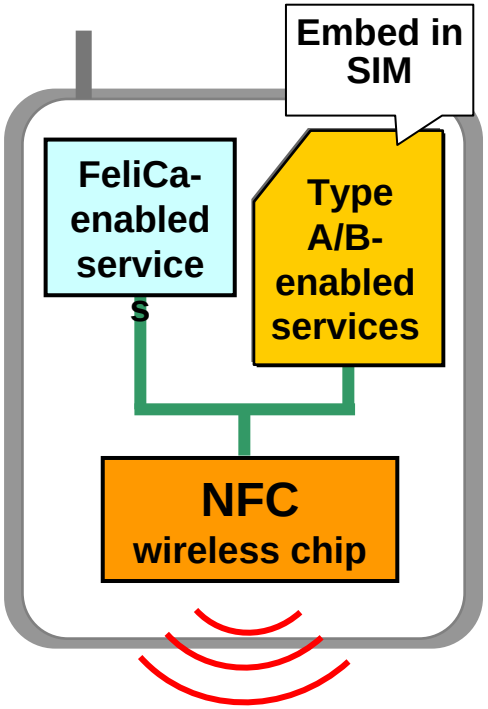
Finance/Payment Business: Advancement of “Osaifu-Keitai” e-Wallet

Aim to support various services available in other markets worldwide, by making FeliCa-enabled “Osaifu-Keitai” compatible with NFC

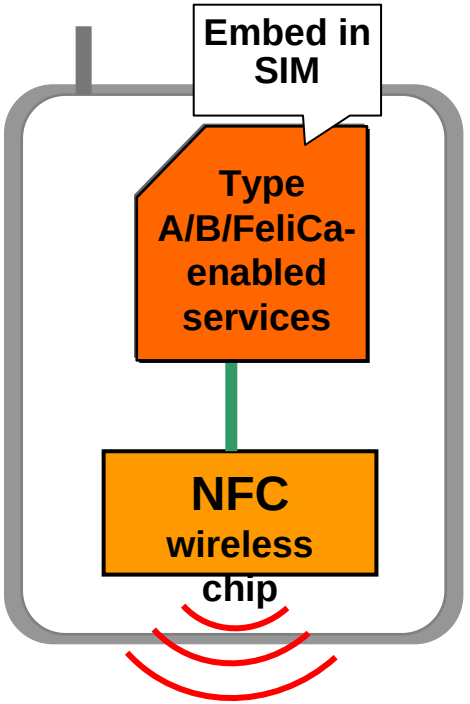
Current system



Transition period 2012 (planned)



SIM card system (Type A/B/FeliCa)

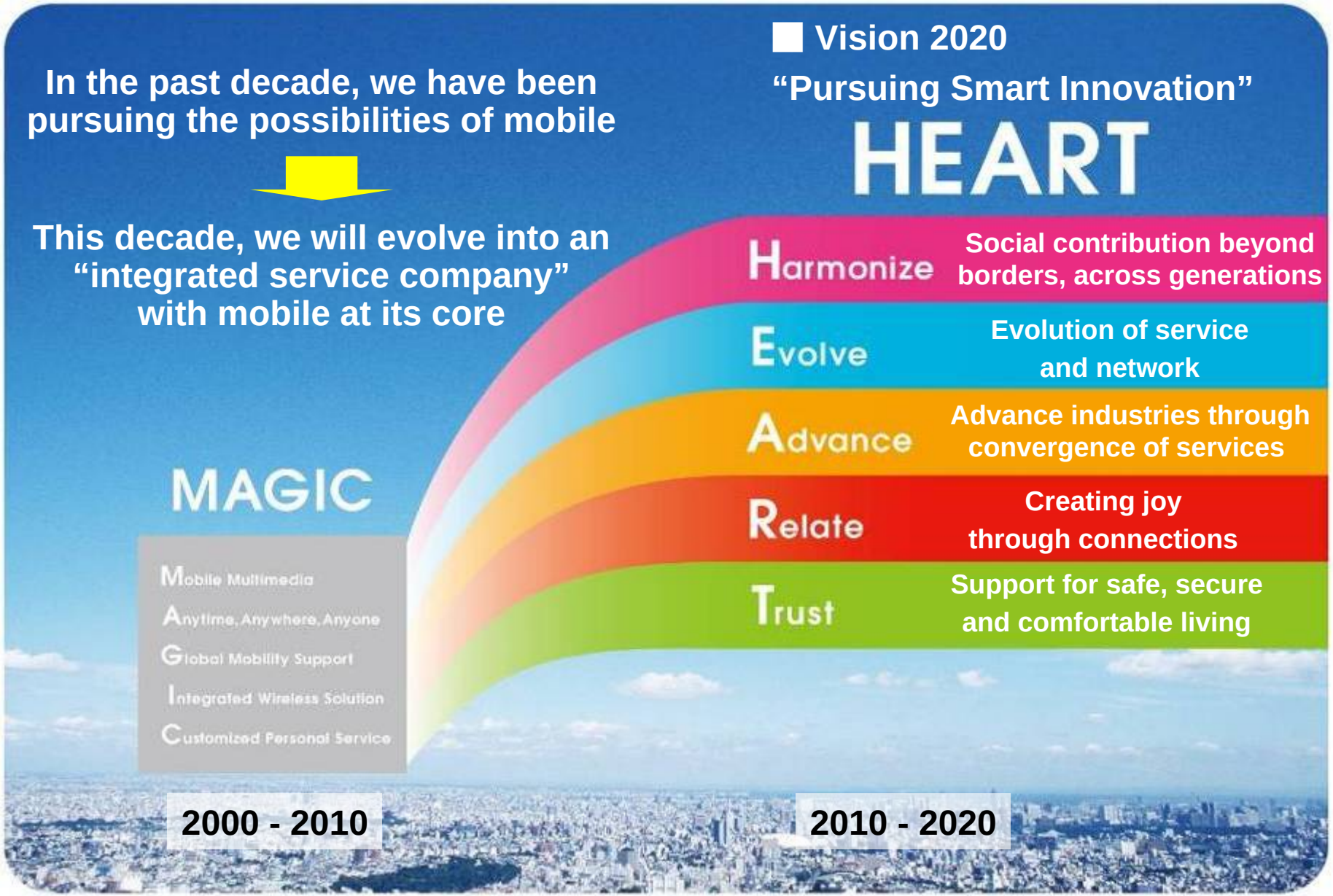


■ **Compatible with existing FeliCa services**

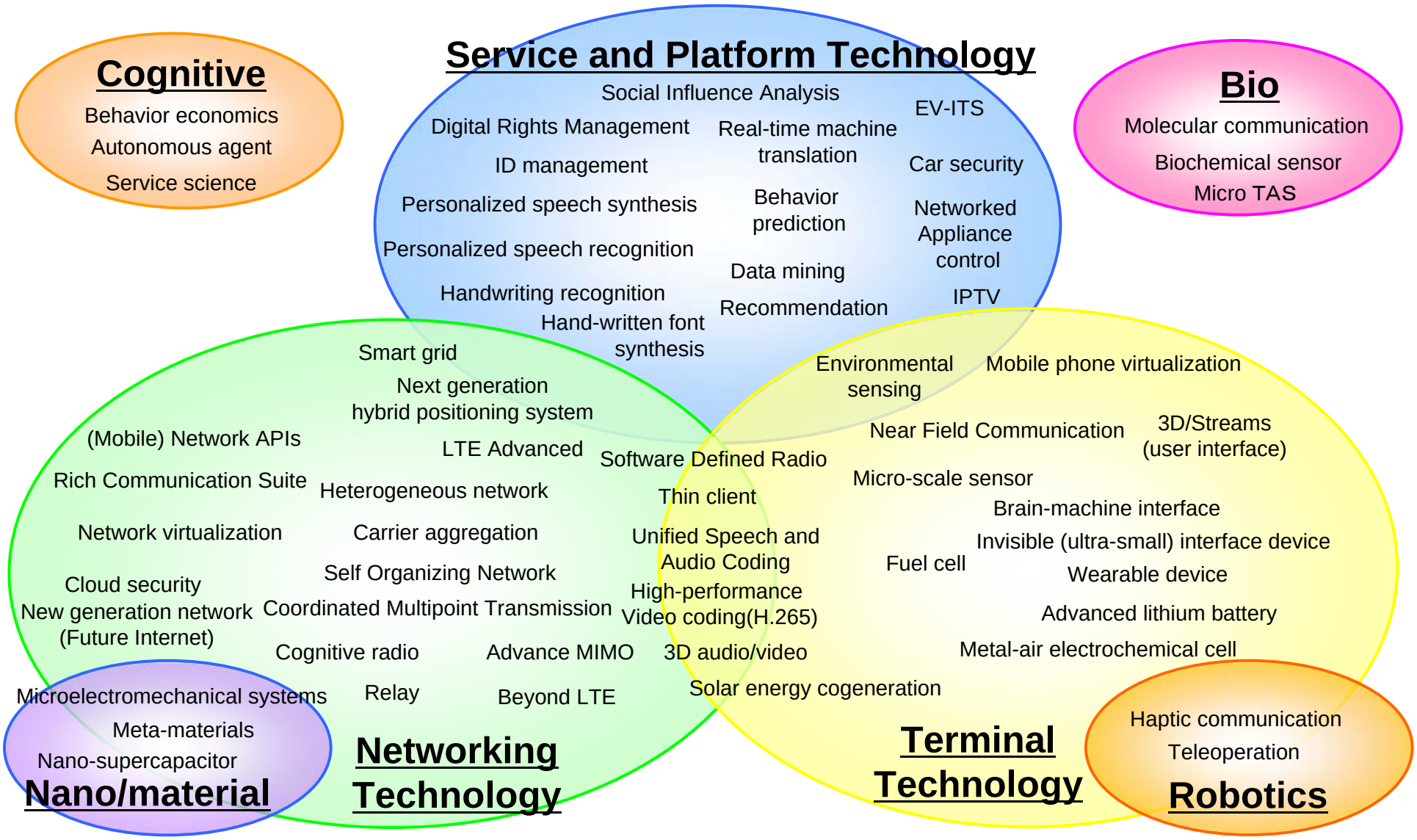
■ **Compatible with services available in other markets**

4. New Corporate Vision “HEART”

Vision for 2020: Pursuing Smart Innovation



Technologies to support Smart Innovation



Unlimited Potential, in Your Hand